NATIONAL SPACE POLICY

HEARING

BEFORE THE

SUBCOMMITTEE ON SPACE SCIENCE AND APPLICATIONS

OF THE

COMMITTEE ON SCIENCE AND TECHNOLOGY U.S. HOUSE OF REPRESENTATIVES

NINETY-SEVENTH CONGRESS

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NATIONAL SPACE POLICY

WEDNESDAY, AUGUST 4, 1982

HOUSE OF REPRESENTATIVES,
COMMITTEE ON SCIENCE AND TECHNOLOGY,
SUBCOMMITTEE ON SPACE SCIENCE AND APPLICATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 1:35 p.m., in room 2318, Rayburn House Office Building, Hon. Ronnie G. Flippo (chairman of the subcommittee) presiding.

Present: Representatives Flippo, Fuqua, Nelson, Brown, Hollenbeck, Winn, McGrath, and Lowery.

Mr. FLIPPO. The subcommittee will come to order.

Today the Subcommittee on Space Science and Applications begins a series of hearings on our national space policy. The subcommittee has repeatedly advocated the establishment of long-range space goals and resolution of many other policy issues which confront our Nation's space activities.

As we begin today's hearings on our national space program, I would like to briefly review our space policy under the leadership of various administrations. Our civil space program has enjoyed strong bipartisan support. Our achievements and progress of NASA are largely a function of the role successive Presidents have chosen for the agency.

The startling achievement of the Soviet Union in October 1957 when they launched the first orbiting satellite clearly demonstrated that we as a nation were not doing enough at that time. Even more than that, it brought home the question of just how great our alleged scientific and technological superiority was. We had clearly fallen behind the Soviets in launch vehicle development. Were we also falling behind other nations in the world in other important aspects of science?

Congress responded to the challenge of Sputnik by passing the NASA Act of 1958. The 1958 act declares it to be the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind. The act further declares that such activities shall be the responsibility of and shall be directed by a civilian agency exercising control over space and aeronautical activities sponsored by the United States. It is clear that Congress desired that space activities of the United States be controlled primarily by a civilian agency—NASA—and that the United States should pursue programs which would provide the greatest benefit to the American people and to the free world.

Nevertheless, Congress also recognized that there were military implications to space. If it were possible to orbit satellites in space

as the Soviet Union had first demonstrated, it would be possible also to orbit bombs or other hostile objects. Consequently, Congress provided in the Space Act that activities peculiar to or primarily associated with the development of weapons systems, military operations, or the defense of the United States—including the research and development necessary to make effective provision for the defense of the United States—shall be the responsibility of and shall be directed by the Department of Defense.

Today we look forward to a presentation of the current administration's national space policy directive by Dr. George Keyworth, who is Director of the President's Office of Science and Technology Policy, and the Honorable James M. Beggs, Administrator of NASA. Our final witness today will be Dr. John H. Gibbons, who is the Director, Office of Technology Assessment, to review the findings and the recommendations of OTA's space policy review.

However, before we hear the testimony of these distinguished gentlemen I would like to acknowledge the presence of the full committee chairman, the former chairman of this subcommittee, who has a long experience and has contributed greatly to the Nation's space policy, the Honorable Don Fuqua.

Mr. FUQUA. Thank you, Mr. Flippo. I want to commend you and the subcommittee for holding these hearings that I think are very much needed in the time frame that we are living in today.

The National Space Act of 1958 requires that adequate provision be made for both aeronautics and space activity for the general welfare and security of the United States. These activities are specified in that act to be carried out by a civilian agency with the exception of those associated with weapons systems and the defense of the Nation. A major objective of our space policy from the very beginning has been to maintain America's leadership in aeronautical and space technology.

As we take stock of our space policy and review our accomplishments, we ask ourselves several questions: One, are we fulfilling that space policy? Are we making adequate provisions to maintain the U.S. leadership in space science and technology?

My concern is that the answer to some of these questions would probably be in the negative. We see the Soviet Union moving steadily forward with establishing a capacity and capability to support permanent manned presence in space. We see the Soviet Union, the Europeans, and the Japanese moving forward with a Halley's Comet mission. We are not only standing still while others move ahead but in the last budget cycle we witnessed an attempt to terminate the Galileo, our only ongoing planetary exploration program.

After a decade of effort in developing land remote sensing technologies, we are putting ourselves in a position to not only forfeit our leadership but to lose our national capability, in large part due to bureaucratic infighting and squabbling. If we are to follow the mandate of our original Space Act, to make adequate provision for aeronautics and space activities and to maintain American leadership in aeronautical and space technology, then we must move out of this posture of "deliberate" and "hover" and move into a position of action. The future success of America's space development depends on commitments we are willing to make now.

We are only one Nation among a growing community of nations involved in the exploration and the utilization of the space environment. These other nations are both convinced of their goals and are capable of meeting them. I think we can either stand by and watch their progress or we can step ahead and try to be a leader along the way.

Thank you, Mr. Chairman.

Mr. FLIPPO. Thank you, Mr. Chairman.

Without objection, I would like to insert my full statement in the record for record purposes.

[The prepared statement of Mr. Flippo follows:]

Mr. FLIPPO. Today, the Subcommittee on Space Science and Applications begins a series of hearings on our national space policy. The subcommittee has repeatedly advocated the establishment of long-range space goals and resolution of many other policy issues which confront our Nation's space activities.

As we begin today's hearing on our national space program. I would like to briefly review our space policy under the leadership of various admin trations. Our civil space program has enjoyed strong bipartisan support Our achievements and progress of NASA are largely a function of the role successive President's have chosen for the agency.

The startling achievement of the Soviet Union in October 1957 when they launched the first orbiting satellite—Sputnik I—clearly demonstrated that we as a nation were not doing enough. Even more than that, however, it brought home the question of just how great was our alleged scientific and technological superiority? We had clearly fallen behind the Soviets in launch vehicle development; were we also falling behind other nations of the world in other important aspects of science?

Congress responded to the challenge of Sputnik by passing the National Aeronautics and Space Act of 1958. The Space Act of 1958 declares it to be the policy of the United States "that activities in space should be devoted to peaceful purposes for the benefit of all mankind." The act further declares that "such activities shall be the responsibility of and shall be directed by, a civilian agency exercising control over aeronautical and space activities sponsored by the United States."

It is clear that Congress desired that the space activities of the United States be controlled primarily by a civilian agency—the National Aeronautics and Space Administration—and that the United States pursue programs which would provide the greatest benefit to the American people and to the free world.

Nevertheless, Congress also recognized that there were military implications to space. If it were possible to orbit satellites in space—as the Soviet Union had first demonstrated to the world in October 1957—it would be possible also to orbit bombs or other hostile objects. Consequently, Congress provided in the Space Act that "activities peculiar to or primarily associated with the development of weapons systems, military operations, or the defense of the United States (including the research and development necessary to make effective provision for the defense of the United States) shall be the responsibility of, and shall be directed by, the Department of Defense."

It should be remembered that when the United States entered the space field in 1958, it was generally assumed that the state of our research and development efforts were at least 2 years behind those of the Soviet Union. Therefore, the fact that this country declared our civilian space program to be conducted in full view of the whole world represents remarkable foresight and courage on the part of the legislators who drafted the Space Act. Perhaps a factor in this decision was the recognition that for the United States to move forward rapidly in space required a massive effort on the part of Government, industry, and universities, and the belief that this mutual effort and cooperation could best be achieved in a free and open manner. It was recognized also that basic principles or building blocks necessary to operate in this new medium of space are applicable to both civilian and military needs.

Why did the United States undertake the exploration of space? What does it mean to the American taxpayer? Does he obtain any practical benefit as a result of this tremendous expenditure? Why should we spend so much money for space research when there are such urgent social problems here on earth?

To uncover the reason why the United States decided to go into the space business, one could search the thousands upon thousands of pages of printed statements in the public press, and could examine the extensive hearings and debates which finally led to the passage of the National Aeronautics and Space Act of 1958. How-

ever, a succinct explanation was offered by the late President John F. Kennedy when he addressed a joint session of the U.S. Congress on the state of the Union on May 25, 1961. He said:

Finally, if we are to win the battle that is going on around the world between freedom and tyranny, if we are to win the battle for men's minds, the dramatic achievements in space which occurred in recent weeks should have made clear to us all, as did the Sputnik in 1957, the impact of this adventure on the minds of men everywhere who are attempting to make a determination of which road they should take * * *.

Recognizing the headstart obtained by the Soviets with their large rocket engines, which gives them many months of leadtime, and recognizing the likelihood that they will exploit this lead for some time to come in still more impressive successes, we nevertheless are required to make new efforts on our own. For while we cannot guarantee that we shall one day be first, we can guarantee that any failure to make this effort will find us last * * *. But this is not merely a race. Space is open to us now; and our eagerness to share its meaning is not governed by the efforts of others. We go into space because whatever mankind must undertake, free men must fully share.

President Kennedy then went on to propose: First, I believe that this Nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to Earth.

Yet, as important as the manned space flight program was, it is clear that President Kennedy had much more in mind than just landing a man on the moon. He said: "Now is the time to take longer strides--time for the Nation to take a clearly leading role in space achievement which in many ways may hold the key to our future on Earth."

President Kennedy then went on to propose not just one national goal, but others as well. In addition to the manned lunar landing, the President proposed the goal of "accelerating the use of satellites for worldwide communications." He said: "When we have put into space a system that will enable people in remote areas of the earth to exchange messages, hold conversations, and eventually see television programs, we will have achieved a success as beneficial as it will be striking."

The President also proposed the goal to have "at the earliest possible time a satellite system for worldwide weather observation." "Such a system," he said, "will be of inestimable commercial and scientific value; and the information it provides will be made freely available to all nations of the world."

In February 1969 memorandum for the Vice President, the Secretary of Defense, the Administrator of NASA, and the Science Adviser, President Nixon wrote, "It is necessary for me to have in the near future definitive recommendations on the direction which the United States space program should take in the post-Apollo period." In the ensuing report to the President, the Space Task Group said the following with regard to the setting of goals:

"We view the challenge of setting new goals, of providing a focus for our future space activities, of expanding the limits of man's reach and thereby demonstrating America's leadership in scientific and technological undertakings while maintaining the confidence of the people in the strength and purpose of our Nation, as the key to continued space leadership by the United States. Facing this challenge, some would urge that our efforts should be restricted to exploitation of existing capability, pointing out, quite correctly, that exciting and challenging missions remain to be accomplished which can utilize the existing base. But such a course would risk loss of the foundation for future achievements—a foundation which depends largely on providing a new capability which challenges our technology."

Following the Space Task Group Report, the President proposed development of the Space Shuttle which dominated our second decade of space activities but with important accomplishments in space science and space applications.

As the Shuttle development neared completion in the late 1970's, a space policy review by President Carter resulted in a policy statement outlining the following major tenets:

Our space policy will reflect a balanced strategy of applications, science, and technology . . . that will: emphasize space applications; emphasize space exploration; take advantage * * * of the space shuttle to reduce cost; assure U.S. scientific and technological leadership; and demonstrate advanced technological capabilities.

Our space policy will become more evolutionary rather than centering around a single engineering feat.

At this time it is infeasible and premature to commit to a high-challenge space engineering initiative. As the resources and manpower requirement of shuttle devel-

opment phasedown, we will have the flexibility to give greater attention to new space activities, to continue programs at present levels, or to contract them.

Today, we look forward to a presentation of the current administration's national space policy directive by Dr. George Keyworth, Director of the President's Office of Science and Technology Policy and Hon. James M. Beggs, Administrator of NASA. Our final witness today will be Dr. John H. Gibbons, Director, Office of Technology Assessment, to review the finding and recommendations of OTA's space policy review.

Without objection, we will permit filming in the room as well.

I recognize the ranking minority member, the gentleman from New Jersey, Mr. Hollenbeck.

Mr. HOLLENBECK. Thank you, Mr. Chairman. I am grateful to you for chairing these hearings today and especially to my colleague, the gentleman from California, Mr. Brown, for requesting these hearings which I hope are the first in a series of several.

I must confess that following over 1 year in its preparation by the administration, the new national space policy is a disappointment to me. Granted, the policy does not preclude any number of different space activities. However, it does not set any direction whatsoever for the civilian space program. In fact, it only reaffirms NASA's close ties to the military.

NASA, with its rich history, its great accomplishments, I fear has been turned into somewhat of a situation comedy father. Like its TV counterpart, it is snickered at because its wallet is bled by ungrateful children but its quiet good nature seems endless.

The tragedy, Mr. Chairman, is that the American people are not aware of the politicizing and militarizing of the agency. The Congress and the press, in my opinion, have failed to do their oversight jobs. How depressing it is to know that America's space policy for the eighties is classified "Top Secret." How frustrating it is to know that we have made the decision to cloak space in national security. We seem to have abandoned the openness of before, and now we take the policy of the Soviet Union as our own. We now hide a program that made its reputation in front of the eyes of the world.

I am the ranking member of the House subcommittee which is supposed to oversee NASA, and I cannot even get the people who run the Shuttle program to answer questions about the program. As a citizen I am not going to play the game that this administration has a civilian space program. It is obvious that what the civilian program does is take the heat for research and development and pay the bills.

The arrogance of this administration, of the military and some of the contractors, toward a civilian agency that has accomplished so much, does not go unnoticed. The Soviet Union remembers well such arrogance in the mid-1950's when interservice rivalry and a "Let the military worry about it" attitude of the Eisenhower administration was shattered by the flight of Sputnik.

I speak for a strong civilian space program, not simply to annoy those who run the agency but because it was a civilian-run team that put us on the Moon, that did it in budget, and that made darn few excuses. I for one do not want a gold-plated space program that is part of some "Star Wars" Pentagon.

I want the public to be aware that the Subcommittee on Space Science and Applications has had only one military space briefing.

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I want you to be aware that the administration has made national security in space their goal. I can only hope that the next generation of Americans will not look back upon those of us here today as the leaders who sat in silence as America turned a noble endeavor into an interstellar war machine.

President Kennedy was once asked the difference between the Atlas rocket that could destroy Moscow and the one that orbited John Glenn. He answered, "Attitude." We went into space as a new frontier, and now we drag the hate and the bitterness of earth into the heavens as if it is the right of man to make war everyplace.

We need a good and brave leadership who will stand up and say "Enough." The greed machine of contractors, revolving-door jobs, the endless excuses to build military hardware, now are being applied to virgin territory. What we are talking about is not national security. What we are talking about is big bucks, big bucks that can be spent without the glare of the press or congressional oversight because the Government can invoke the magical phrase, "national security."

The space policy of the administration is becoming a tragedy. It is ill-conceived, in my opinion, and endangers our children's futures. How pathetic our oversight has been, and I share in the blame for that. We fall short in our ability to get the truth. It seems to me the goodwill that was space is gone. The NASA that set sail on this new sea may become a romantic memory.

I want the Pentagon to buy its own shuttles, to pay its own way. I believe this new space policy violates the charter of NASA for the peaceful exploration of space. I remind my colleagues that we should listen to the voices of the half million Americans who built the hardware, who wrote the programs, who tracked the satellites, and who in some cases gave their lives for a civilian program.

The late pioneer, Dr. Werner Von Braun, glum-faced and desolate as he watched the Nixon administration dismantle the civilian effort after Apollo, told the reporter who asked him if he feared this was the end of space exploration: "They can make it political. They can play their games but someday something will happen, another Sputnik, another shock * * * and they will need us again."

I pray all of us have the vision to understand this is not some political game. The gauntlet has been thrown down and it is time for us to do our jobs and show that we are the legislative branch of Government, the Government branch that oversees the executive, with courage and with authority. I remind my colleagues of the words of Dante, who wrote: "The hottest places in hell are reserved for those who do nothing in a period of moral crisis." I believe firmly that the survival of our civilian space program is in just such a moral crisis. This is the first in a series of hearings on national space policy, and I ask my colleagues to face our constitutional responsibilities, setting partisanship aside.

Mr. Chairman, I ask permission to revise and extend my remarks.

Mr. FLIPPO. Without objection, so ordered.

The distinguished ranking minority member of the full committee, Mr. Winn.

Mr. WINN. Thank you, Mr. Chairman.

Mr. Chairman, I join with you in welcoming Jay Keyworth, Jim Beggs, and John Gibbons to the subcommittee today. There has certainly been a lot of press concerning the new space policy statement that was released following the successful landing of the Space Shuttle on July 4. Most of this has been negative. Members of the press are concerned that the new policy promotes the militarization of outer space and may eventually abolish the civilian space program.

Even though it reads that way—and I made this point quite clear to some people in the administration, that I think they could have done a better job in the presentation of the space policy, in their advice to the President— I still do not believe that the policy promotes militarization of outer space.

The new space policy states that the U.S. space program will be comprised of two separate, distinct, and strongly interactive programs, national security and civil. The policy, Mr. Chairman, reaffirms the importance of the civilian space program.

Now I look forward to Jim Beggs' and Jay Keyworth's testimony to fully explain what effect the new space policy will have on programs like planetary exploration, applications, and space science. Their testimony should help answer the concerns that have been expressed by the press and many others, some here today, as well as some of those expressed by my colleagues on the committee. I look forward to their testimony.

Thank you, Mr. Chairman.

Mr. FLIPPO. Thank you, Mr. Winn.

Are there other members that would like to be heard at this time? Mr. Nelson?

Mr. NELSON. Thank you, Mr. Chairman.

I am delighted that you have scheduled, Mr. Chairman, this hearing on the country's national space policy, and I would like to take just a little different tack in a brief opening statement.

I have here, right off of the UPI wire from the Johnson Space Center in Houston, "Johnson Space Center Director Christopher Kraft bid an emotional farewell to the space program in which he worked for 37 years and repeated his call for a national commitment to take full advantage of man's newest frontier." This is a quote of Chris Kraft. "I frankly believe that there needs to be more emphasis on technology, more emphasis on research and development, and more emphasis on the space program than this administration has provided," Kraft told the final news conference as a space agency official. "I am hopeful that the leaders of NASA can convince this administration that it is the right thing to do."

Mr. Chairman, I am deeply concerned that absent strong leadership from the President, that the superb talents at NASA—including our very able Administrator—are in danger of being squandered. NASA has been a "can-do" agency and it has shown what it can do. I am concerned that the short-sighted policy of reducing NASA budgets in the name of economic recovery is going to have ultimately the reverse effect than what is intended.

The drive to develop the new technologies has been and continues to be absolutely critical to the future of our economy. If there is ever any doubt of that, look at just the spinoffs from the Apollo program and what that did to us in improving our competitive edge

in the world economic order. That drive in electronics and medicine, aviation, communications, computers, has for the last 25 years been given shape by the quest for achievement in space.

Therefore, I say to these gentlemen whom I look forward to hearing their comments, as they make decisions in the future I would urge them that in the name of economic recovery for the next decade in this country, do not mortgage our high technology future.

Mr. FLIPPO. Thank you, Mr. Nelson.

Mr. Brown?

Mr. BROWN. Mr. Chairman, I have a lengthy but moderate and restrained statement which I will put in the record at this point.

Mr. FLIPPO. The gentleman's statement will be inserted, without objection.

[The statement of Mr. Brown follows:]

OPENING STATEMENT OF CONGRESSMAN GEORGE E. BROWN, JR. BEFORE THE SPACE SCIENCE AND APPLICATIONS SUBCOMMITTEE OF THE COMMITTEE ON SCIENCE AND TECHNOLOGY NATIONAL SPACE POLICY HEARING, AUGUST 4, 1982

Mr. Chairman, I am extremely please, that you are conducting this hearing today on the subject of national space policy. As we are all aware, the President announced a new National Space Policy on July 4, 1982 at the most recent landing of the space shuttle, concluding its test flight phase.

I have been calling for a renewed and vigorous space policy for some time. As you know, Mr. Chairman, I introduced legislation under President Jimmy Carter and again under Ronald Reagan to establish a National Space Policy in the hopes of promoting the development of a coherent, long-range policy. I should be pleased that we finally have a national policy, but frankly, I am dismayed at the obvious shift in priority toward the military uses of space. The policy directive came as no surprise since the Administration's posture was clear before the announcement. But the increasing use of the civilian space agency (the National Aeronautics and Space Administration—NASA) for Department of Defense purposes is unprecedented. The new policy largely neglects the opportunity for better serving the civilian, economic and technological needs of the nation in favor of military uses.

I cannot entirely blame this Administration for the downward trend in funding for civilian space programs or for the increasingly larger budget for Department of Defense activities. According to NASA's figures, defense spending in space has been slowly creeping up relative to civilian programs for some years. But under this Administration, for the first time, defense spending in space will exceed civilian spending. Moreover, it is no secret that the space shuttle, funded primarily by NASA, is largely committed to defense purposes, with more than half of its flights destined for defense missions into the next decade.

I am not advocating that we cease all activities in space which are related to the military. In fact, quite the contrary; I have been interested for some time in a proposal recently introduced by my colleague from Kansas, Mr. Winn, which raises the possibility of an international peace-keeping satellite. The proposal involves the establishment by the United Nations of a satellite that will be used to monitor worldwide military activities, including arms buildup, troop movements, and all other aggressive military actions.

The military surveillance systems of both the United States and the Soviet Union have already contributed significantly to maintaining peace by denying the element of surprise or advantage in a first strike. But the pursuit by both the Soviet Union and the United States of anti-satellite weapons is a serious threat to the tenuous peace we have maintained so far. A peacekeeping satellite could go far in maintaining the security of the world.

What I do advocate is that we cease activities in space that threaten world peace, such as the weaponization of space. The consequences of the weaponization of space go beyond the threat of war and destabilization and would result in diminished civilian and commercial exploitation of space. If anti-satellite capabilities continue to be developed by the United States as advocated in the President's space policy, this could seriously discourage commercial, and inhibit scientific, uses of space. Even a short war in space could close off the benefits of space by surrounding the earth

with a belt of debris, creating collision hazards that could prove destructive and expensive.

The "militarization" of space has other consequences which do not grab headlines, but which might be as serious a threat to the free world as war. One of these consequences is the secrecy that surrounds military activities. During the last shuttle launch, for the first time, we could not "see" or we could not "hear" some of the activities on board because they were classified. NASA has never had to turn away requests for information about a major payload with so many "no comments". The National Space Act which created NASA as a civilian space agency in 1958 mandates the "widest practicable and appropriate dissemination of information concerning its activities and the results thereof". The secrecy that will continue to surround NASA is a serious deviation from the free civilian space program we have known. The consequences to science and ultimately the economy are great.

Programs do not make policy. But NASA, caught between decreased funding and increased military activities is a crippled agency. Surely program funding is a better way than policy statements to determine where the Administration's priorities lie. And if this year's budget debate is any indication, the administration's priority is clearly military. The benefits provided this country economically through space technology spin-offs, through jobs, and through improvements throughout many sectors of our society—spanning agriculture, communications, medicine, energy—are unparalleled in any other federal program. To turn our back on the fundamental economic strength represented by our country's scientific leadership in the name of national security is, in my view, a form of hypocrisy. It is also bad economic policy.

Cuts in research and analysis have hit the planetary sciences hardest. Despite the past successes and the inspiration and national pride this program fosters, the planetary program expenditures in fiscal year 1983, adjusted for inflation, are two-thirds what they were five years ago. What is left of the civilian space program is shrunken and diminishing. There were 38 lunar and planetary launches in the 1960's, 14 in the 1970's, and, with the cancellation of the Venus Orbiting Imaging Radar, 1 approved mission for the 1980's.

I do not assume that high numbers of launches assure us a quality space program. But it is noteworthy that in 1980, according to the President's report on Aeronautics and Space, the United States had the lowest number of launches since 1959. We had 13 successful launches in 1980 and we had 10 in 1959. This compares with a high of 73 in 1966. By comparison, the Soviets had 89 launches in 1980 and overall have completed almost twice as many launches, total, as we have. It is true that our budget is not as ample or as flexible as it used to be. But the President's space policy, rather than addressing this serious concern, leaves unresolved the question of how to have a viable space program under a restricted budget.

Clearly lacking in the new policy is an aggressive high-challenge space engineering initiative such as a permanent space station operating in low earth orbit, similar to, but better than, what the Soviet Union now has. The omission is a perplexing one since such a space station has been considered a logical next step in our space efforts. The shuttle program was originally conceived to service a manned space station, and we ought to take advantage of this capability. However, an initiative such as this would take a vision and commitment that this policy does not have.

Similarly lacking is any initiative regrading the exploitation of our satellite capabilities. I understand that a 'Global Habitability' initiative will be announced at the upcoming Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space to be held in Vienna, August 9-21. The program would utilize our earth-observation capabilities to research and assess the earth's resources and 'habitability'. Since I understand that no new funding would be requested for such an endeavor, it is difficult to see that we would be doing anything all that much different than we are doing now, particularly in light of reduced funding for satellites of the most basic kind, such as the Polar Orbiting weather satellite, and the proposal, without a plan, to transfer LANDSAT to the private sector.

Mr. Chairman, the United States was shocked out of complacency in 1957 when the Soviets launched their first Sputnik. I hope we feel sufficiently shocked at the military implications of this new space policy to decide to take a different direction than our counterparts. We are superior technologically to the Soviet Union. We have more resources. More advanced science. More inspired scientists. Let's not cloak our science and our scientists in secrecy and jeopardize the free world. Yes, let us meet the challenge. But let us meet it with peace and greatness befitting our nation.

Mr. Chairman, I look forward to this first in a series of hearings on national space policy. Today we will hear the perspective of the civilian sector on the new policy. I look forward in subsequent hearings to hearing from the military establishment.

Mr. FLIPPO. Mr. McGrath?

Mr. MCGRATH. Thank you, Mr. Chairman.

I ask unanimous consent to revise and extend my remarks.

Mr. FLIPPO. Without objection, so ordered.

[The statement of Mr. McGrath follows:]

STATEMENT OF RAYMOND J. MCGRATH

Mr. Chairman, I would also like to congratulate you for conducting these hearings, and welcome our distinguished panel.

I, too, was somewhat taken aback with the space policy as enunciated on July 4 of this year, not so much for what it said, but for what it did not say. I was hoping that there would be some discussion of the disposition of the fifth orbiter, the status of plans for a future manned presence in space through a space station, and future planetary exploration missions.

I was also taken aback to a great extent not so much by the creation of a senior interagency group for space, but by the fact that our capable Administrator of the National Aeronautics and Space Administration was mentioned last as a member of that particular group.

The heavy military emphasis of the policy was rather discomforting, and illustrative of increasing attempts to militarize the civilian space agency. Funding for DOD space programs for the first time this year is equal to NASA's entire budget. While I feel we should fully exploit all the resources available to us to provide for the security of our nation, I hope it does not take place at the expense of the civilian space program. The benefits provided this country through space technology spin-offs, through jobs and through improvments in agriculture, communications, medicine and energy are unparalled in any other Federal programs.

Therefore, I have concern for all of those things that have been mentioned by the other members of the Subcommittee today. I would hope that our distinguished panel could address itself to some of those concerns that have been enunciated here.

Thank you.

Mr. MCGRATH. I would also like to congratulate you for conducting these hearings, and welcome our distinguished panel.

I, too, was somewhat taken aback with the space policy as enunciated on July 4 of this year, not so much for what it said but for what it did not say. I was hoping that there would be some discussion at that time of the disposition of the fifth Orbiter, the status of plans for future manned presence in space through a space station, and the future of planetary exploration missions. I was also taken aback to a great extent by not so much the creation of a senior interagency group for space but the fact that our capable Administrator of the National Aeronautics and Space Administration was mentioned last as a member of that particular group.

Therefore, I have concern for all of those things that have been enunciated by the other members and the subcommittee today. I would hope that our distinguished panel could address itself to some of those concerns that have been enunciated here.

Thank you.

Mr. FLIPPO. Thank you, Mr. McGrath.

Dr. Keyworth, I understand, has to leave at 2:30, and we are delighted to have you here. We would hope that you present your statement as you deem appropriate and perhaps we could have an opportunity for some questions.

STATEMENT OF DR. GEORGE A. KEYWORTH, DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY, EXECUTIVE OFFICE OF THE PRESIDENT, ACCOMPANIED BY VICTOR H. REIS, ASSISTANT DIRECTOR FOR NATIONAL SECURITY AND SPACE

Dr. KEYWORTH. Thank you.

Chairman Flippo and members of the subcommittee, I am pleased to be here today to discuss the new national space policy that you well know was recently approved by the President. I was the chairman of the review that produced the new national space policy directive.

With me today is Dr. Victor Reis, who was the working group chairman and who serves as Assistant Director in my office for National Security and Space.

I appreciate the opportunity to discuss the space policy and the future directions of the U.S. space program with you today. Since I am sure you have questions about that policy and its implications, I will present only a brief statement in order to permit maximum time to respond to your questions.

As you know, the space policy was developed by a group consisting of representatives from my office, NASA, Defense, NOAA, State, the Director of Central Intelligence, the Joint Chiefs of Staff, ADCA, as well as the OMB and the National Security Council. However, in addition to the formal working group meetings, a large number of special issue-oriented task groups were formed as required. Members of my staff and the other participating agencies visited every NASA space center, every major military command or organization relating to space, as well as those appropriate user agencies such as NOAA, for in-depth discussions with senior management. We also actively sought out and received recommendations from industry, including Rockwell, Lockheed, TRW, Martin-Marietta, General Dynamics, Hughes, COMSAT, DuPont, General Electric, and others.

We made similar contacts with professional and trade associations, such as the American Institute of Aeronautics and Astronautics and the Aerospace Industries Association, as well as with the appropriate panels of the National Academy of Sciences, many other groups, and numerous private citizens. I could go on further but my point is that we made a determined effort to insure that we received as complete a body of input as possible from all sectors interested in space and space policy.

Let me now proceed to describe the essential elements of that policy. Certainly the STS, the space transportation system, occupied a central position in developing a new space policy. The first priority of the STS program is to make the system fully operational and cost effective in providing routine access to space.

The United States is fully committed to maintaining world leadership in space transportation, and must now move toward an integrated system. We looked long and hard at Shuttle operations management and concluded that until the Shuttle operations become more mature, perhaps in a few years, it is premature to identify the most appropriate long-term management organization.

The Shuttle brings to the United States space program a unique and powerful new capability, a capability that departs from that available with expendable launch vehicles. Accordingly, we must approach its utilization from a new perspective, with vision and imagination. We must not simply continue the momentum from another era, but must exploit the full dimension available to us with discrimination and judgment. We must focus both our effort and our support toward what are today the most promising areas

of science, exploration, applications, and national security needs, while pursuing future but less well-defined opportunities.

This necessarily implies decisions—tough choices and decisions—that may well be in conflict with some traditions and institutional considerations. But we have entered a new era, an era made possible by the expenditure of public funds and based upon public trust. It is our responsibility now to proceed to justify that trust and those precious monies by responsibly exploiting the potential available to us.

As the commercial opportunities offered by space exploitation evolve, the new policy encourages a strong role for the private sector, and I might say that NASA's joint venture program is one that fits well within this policy. However, within the American free enterprise mechanisms we look to even greater utilization of space for a variety of applications and technologies.

We have received many criticisms pertaining to the lack of mention of specific programs in the space policy. I assure you this was deliberate. We believe policy should provide guidance, guidance for overall direction and scope, for coordination between sectors, and for balance. But it is the responsibility of the operating agencies—NASA, NOAA, the DOD—to develop these myriad capabilities and to propose specific programs within the funds that Congress authorizes and appropriates.

We are also well aware of the concern that many interested parties have expressed about the so-called militarization of space. Whereas our space policy does, of course, call for continued use of space for national security, recognizing the important role that space plays in addressing that responsibility, it does not imply that national security uses of space in any way inhibit or are developed at the expense of civil or commercial uses. Indeed, our objective is to the contrary. Sharing, joint use, and coordination are an essential part of Shuttle development and utilization in order to continue American leadership in space exploitation.

In addition to encouraging private sector participation, the new policy particularly emphasizes the importance of international cooperation. As more and more nations realize the real potential and practical benefits of space R&D, shared benefits should be accompanied by acceptance of shared costs. Many of our most successful space endeavors are already the result of such cooperation, and we encourage the development of even more comprehensive and diverse cooperation.

However, let me conclude my statement by noting that President Reagan's new space policy represents a strong affirmation of our Nation's historic commitment to space. Our space program is broad, encompassing the civil, commercial, and military sectors, all of which are independent and interdependent, with each sector resting upon a broad, common base of science and technology. The United States is the world leader in space and our policy is, in simplest terms, to remain so.

I will be happy to respond to any questions at this time.

[The prepared statement of Dr. Keyworth follows:]

STATEMENT OF DR. GEORGE A. KEYWORTH, II
SCIENCE ADVISOR TO THE PRESIDENT AND
DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY
EXECUTIVE OFFICE OF THE PRESIDENT
BEFORE THE
SUBCOMMITTEE ON SPACE SCIENCE AND TECHNOLOGY
COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
HEARING ON NATIONAL SPACE POLICY
AUGUST 4, 1982

CHAIRMAN FLIPPO AND MEMBERS OF THE SUBCOMMITTEE:

I AM PLEASED TO BE HERE TODAY TO DISCUSS THE NEW NATIONAL SPACE POLICY RECENTLY APPROVED BY THE PRESIDENT. I WAS THE CHAIRMAN OF THE REVIEW THAT PRODUCED THE NEW NATIONAL SPACE POLICY DIRECTIVE, WHICH IS FORMALLY DESIGNATED NATIONAL SECURITY DECISION DIRECTIVE #42. WITH ME TODAY IS DR. VICTOR H. REIS, WHO WAS THE WORKING GROUP CHAIRMAN AND SERVES AS ASSISTANT DIRECTOR OF OSTP FOR NATIONAL SECURITY AND SPACE. I APPRECIATE THE OPPORTUNITY TO DISCUSS THE SPACE POLICY AND THE FUTURE DIRECTIONS OF THE U.S. SPACE PROGRAM WITH YOU TODAY. SINCE I AM SURE YOU HAVE QUESTIONS ABOUT THAT POLICY AND ITS IMPLICATIONS, I WILL PRESENT A BRIEF STATEMENT IN ORDER TO PERMIT TIME TO RESPOND TO YOUR QUESTIONS.

THE SPACE POLICY WAS DEVELOPED BY A GROUP CONSISTING OF REPRESENTATIVES OF OSTP, NASA, DEFENSE, NOAA, STATE, THE DIRECTOR OF CENTRAL INTELLIGENCE, THE JOINT CHIEFS OF STAFF, ACDA, AS WELL AS THE OFFICE OF MANAGEMENT AND BUDGET

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AND THE NATIONAL SECURITY COUNCIL. IN ADDITION TO THE FORMAL WORKING GROUP MEETINGS, A NUMBER OF SPECIAL ISSUE-ORIENTED TASK GROUPS WERE FORMED AS REQUIRED.

MEMBERS OF MY STAFF AND THE OTHER PARTICIPATING AGENCIES VISITED EVERY NASA SPACE CENTER, EVERY MAJOR MILITARY COMMAND OR ORGANIZATION RELATING TO SPACE, AS WELL AS THOSE APPROPRIATE USER AGENCIES, SUCH AS NOAA, FOR IN-DEPTH DISCUSSIONS WITH SENIOR MANAGEMENT. WE ACTIVELY SOUGHT OUT AND RECEIVED RECOMMENDATIONS FROM INDUSTRY (INCLUDING ROCKWELL, LOCKHEED, TRW, MARTIN-MARIETTA, GENERAL DYNAMICS, HUGHES, COMSAT, DUPONT, GENERAL ELECTRIC, UNITED TECHNOLOGIES, GRUMMAN, AND OTHERS). WE MADE SIMILAR CONTACTS WITH PROFESSIONAL AND TRADE ASSOCIATIONS, SUCH AS THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS AND THE AEROSPACE INDUSTRIES ASSOCIATION, AS WELL AS WITH THE APPROPRIATE PANELS OF THE NATIONAL ACADEMY OF SCIENCES, OTHER SPACE ADVISORY GROUPS, AND NUMEROUS PRIVATE CITIZENS. I COULD GO ON FURTHER, BUT MY POINT IS THAT WE MADE A DETERMINED EFFORT TO ENSURE THAT WE RECEIVED AS COMPLETE A BODY OF INPUT AS POSSIBLE FROM ALL SECTORS INTERESTED IN SPACE AND SPACE POLICY. LET ME NOW PROCEED TO DESCRIBE THE ESSENTIAL ELEMENTS OF THAT POLICY.

CERTAINLY THE SPACE TRANSPORTATION SYSTEM (STS) OCCUPIED A CENTRAL POSITION IN DEVELOPING THE NEW SPACE POLICY. THE FIRST PRIORITY OF THE STS PROGRAM IS TO MAKE THE SYSTEM FULLY OPERATIONAL AND COST-EFFECTIVE IN PROVIDING ROUTINE ACCESS TO SPACE. THE UNITED STATES IS FULLY COMMITTED TO MAINTAINING WORLD LEADERSHIP IN SPACE TRANSPORTATION, AND MUST NOW MOVE TOWARD AN INTEGRATED SYSTEM. WE LOOKED HARD AND LONG AT SHUTTLE OPERATIONS MANAGEMENT AND CONCLUDED THAT, UNTIL THE SHUTTLE OPERATIONS BECOME MORE MATURE--PERHAPS IN SEVERAL YEARS--IT IS PREMATURE TO IDENTIFY THE MOST APPROPRIATE LONG-TERM MANAGEMENT ORGANIZATION.

THE SHUTTLE BRINGS TO THE UNITED STATES SPACE PROGRAM A UNIQUE AND POWERFUL NEW CAPABILITY, A CAPABILITY THAT DEPARTS FROM THAT AVAILABLE WITH EXPENDABLE LAUNCH VEHICLES. ACCORDINGLY, WE MUST APPROACH ITS UTILIZATION FROM A NEW PERSPECTIVE, WITH VISION AND IMAGINATION. WE MUST NOT SIMPLY CONTINUE THE MOMENTUM FROM ANOTHER ERA, BUT MUST EXPLOIT THE FULL DIMENSION AVAILABLE TO US, WITH DISCRIMINATION AND JUDGMENT. WE MUST FOCUS BOTH OUR EFFORT AND SUPPORT TOWARD WHAT ARE TODAY THE MOST PROMISING AREAS OF SCIENCE, EXPLORATION, APPLICATIONS, AND NATIONAL SECURITY NEEDS WHILE PURSUING FUTURE BUT LESS WELL DEFINED OPPORTUNITIES. THIS NECESSARILY IMPLIES DECISIONS--TOUGH CHOICES AND DECISIONS--THAT MAY BE IN CONFLICT WITH SOME TRADITIONS AND

INSTITUTIONAL CONSIDERATIONS. BUT WE HAVE ENTERED A NEW ERA, AN ERA MADE POSSIBLE BY THE EXPENDITURE OF PUBLIC FUNDS AND BASED UPON PUBLIC TRUST. IT IS OUR RESPONSIBILITY NOW TO PROCEED TO JUSTIFY THAT TRUST AND THOSE PRECIOUS MONIES BY RESPONSIBLY EXPLOITING THE POTENTIAL AVAILABLE TO US.

AS THE COMMERCIAL OPPORTUNITIES OFFERED BY SPACE EXPLOITATION EVOLVE, THE NEW SPACE POLICY ENCOURAGES A STRONG ROLE FOR THE PRIVATE SECTOR; NASA'S JOINT VENTURE PROGRAM IS ONE THAT FITS WELL WITHIN THIS POLICY. BUT WITHIN THE AMERICAN FREE ENTERPRISE MECHANISMS, WE LOOK TO EVEN GREATER UTILIZATION OF SPACE FOR A VARIETY OF APPLICATIONS AND TECHNOLOGIES.

WE HAVE RECEIVED MANY CRITICISMS PERTAINING TO THE LACK OF MENTION OF SPECIFIC PROGRAMS IN THE SPACE POLICY. I ASSURE YOU THIS WAS DELIBERATE. WE BELIEVE POLICY SHOULD PROVIDE GUIDANCE--GUIDANCE FOR OVERALL DIRECTION AND SCOPE, FOR COORDINATION BETWEEN SECTORS, AND FOR BALANCE. BUT IT IS THE RESPONSIBILITY OF THE OPERATING AGENCIES, NASA, NOAA, AND THE DOD, TO DEVELOP THESE MYRIAD CAPABILITIES AND TO PROPOSE SPECIFIC PROGRAMS WITHIN THE FUNDS THAT CONGRESS AUTHORIZES AND APPROPRIATES.

WE ARE ALSO WELL AWARE OF THE CONCERN THAT MANY INTERESTED PARTIES HAVE EXPRESSED ABOUT THE SO-CALLED "MILITARIZATION OF SPACE." WHEREAS OUR SPACE POLICY DOES

OF COURSE CALL FOR CONTINUED USE OF SPACE FOR NATIONAL SECURITY, RECOGNIZING THE IMPORTANT ROLE THAT SPACE PLAYS IN ADDRESSING THAT RESPONSIBILITY, IT DOES NOT IMPLY THAT NATIONAL SECURITY USES OF SPACE IN ANY WAY INHIBIT OR ARE DEVELOPED AT THE EXPENSE OF CIVIL OR COMMERCIAL USES. INDEED, OUR OBJECTIVE IS TO THE CONTRARY. SHARING, JOINT USE, AND COORDINATION ARE AN ESSENTIAL PART OF SHUTTLE DEVELOPMENT AND UTILIZATION IN ORDER TO CONTINUE AMERICAN LEADERSHIP IN SPACE EXPLOITATION.

IN ADDITION TO ENCOURAGING PRIVATE SECTOR PARTICIPATION, THE NEW SPACE POLICY PARTICULARLY EMPHASIZES THE IMPORTANCE OF INTERNATIONAL COOPERATION. AS MORE AND MORE NATIONS REALIZE THE REAL POTENTIAL AND PRACTICAL BENEFITS OF SPACE RESEARCH AND DEVELOPMENT, SHARED BENEFITS SHOULD BE ACCOMPANIED BY ACCEPTANCE OF SHARED COSTS. MANY OF OUR MOST SUCCESSFUL SPACE ENDEAVORS ARE ALREADY THE RESULT OF SUCH COOPERATION, AND WE ENCOURAGE THE DEVELOPMENT OF EVEN MORE COMPREHENSIVE AND DIVERSE COOPERATION.

LET ME CONCLUDE THIS STATEMENT BY NOTING THAT PRESIDENT REAGAN'S NEW SPACE POLICY REPRESENTS A STRONG AFFIRMATION OF OUR NATION'S HISTORIC COMMITMENT TO SPACE. OUR SPACE PROGRAM IS BROAD, ENCOMPASSING THE CIVIL, COMMERCIAL, AND MILITARY SECTORS, ALL OF WHICH ARE INDEPENDENT AND INTERDEPENDENT, WITH EACH SECTOR RESTING UPON A BROAD COMMON BASE OF SCIENCE AND TECHNOLOGY.

THE UNITED STATES IS THE WORLD LEADER IN SPACE, AND OUR POLICY IS--IN SIMPLEST TERMS--TO REMAIN SO.

I WILL BE HAPPY TO RESPOND TO YOUR QUESTIONS AT THIS TIME.

Mr. FLIPPO. Thank you very much, Doctor, for that statement.

As the chairman of the review that produced the statement, could you share with us what issues you hoped to resolve when you undertook the study and what issues were resolved by the study?

Dr. KEYWORTH. Mr. Chairman, I welcome that question. I attempted to address it in very general terms at the very beginning of my statement because I very strongly believe that the Shuttle represents a totally new capability and, I will repeat, brings in a new era.

When this administration took office the Shuttle had not yet flown its first flight. I think many of the communities that utilize and depend upon space exploration have not really directed their activities and expectations for the future into the Shuttle area.

I think what we attempted to do, albeit in a broad fashion, was to define what the overall objectives of the Shuttle era of space exploration should be. I think it was essential to carefully avoid specific issues such as a space platform, acquisition of a fifth orbiter, and so on. I think in the long term, 3 or 4 years from now, the inclusion of those issues or focusing upon those issues would have detracted from the general guidance of the policy, which rests upon using the Shuttle and its new capabilities to retain U.S. leadership in space.

Mr. FLIPPO. Dr. Keyworth, did you know in the beginning that the civilian space policy statement would be released as a part of the national security decision directive, and could you tell us what part OMB played in the formulation of that policy statement?

Dr. KEYWORTH. OMB participated as a member of the working group, and I might say that OMB did not focus solely upon budgetary issues. They played the role of a very interested and responsible partner.

As far as the first part of your question, I must admit I never thought about it, except that I assumed that some elements of the space policy would necessarily be classified. I assure you that very little, and certainly virtually no substance, of the space policy has been kept from the American people under the guise of classification.

Mr. FLIPPO. Doctor, I know that you believe that the budget is really the vehicle for implementation of policy. I think that is the best indication of what a policy is. In view of the fact that the United States is facing increased foreign competition in transportation vehicles—that is the Ariane—and in view of the fact that the Japanese and the Europeans and others are proceeding very rapidly in the areas of remote sensing and materials processing, satellite communications and others, do you believe that the current policy of the administration as evidenced by the budget is adequate to address those questions?

Dr. KEYWORTH. Mr. Chairman, I certainly do, and I will be happy to defend each and every one point by point. In the policy process and in the budgetary process we have attempted to address the components of American leadership. Let me take a couple of them, if I may.

We refer to the Ariane and the competitive threat from France, but let me simply point out that next year the United States will spend $6.65 billion in NASA, a nearly like amount in the Depart-

ment of Defense that does develop many new technologies; in contrast, the European Space Agency will devote little more than $1 billion. That is one point.

The Japanese are making significant advances in communication and are focusing a concentrated effort upon communication—but so are we. The administration chose not to support the 30-20 gigahertz activity directly in NASA because of a parallel program under development in the military that we felt would eventually benefit civilian communication.

As far as remote sensing in Japan, again the Japanese have been approaching me on many occasions in the last several months to try to develop a participation or a cooperation in our remote sensing activities. I believe they prefer this approach to the considerable expense of developing their own.

We face a threat; we face competition. But I, for one, believe that the competition is good. As long as we use our judgment and do not try to, let's say, exploit every conceivable application of the vast horizons of space independent of its promise, our space program will continue to remain the undisputed world leader.

Mr. FLIPPO. In the interest of time I would like to submit some questions. If you would reply for the record, we would be grateful, and this might include any member if that would be acceptable to you.

Dr. KEYWORTH. Certainly.

Mr. FLIPPO. Could you tell us what you think we ought to be doing in 10 to 15 years in space?

Dr. KEYWORTH. I referred generally to the broad scope of capabilities with the Shuttle. For the last 15 years we have focused very heavily upon planetary exploration. I hope that in 15 years we can look back on a program that is filled with a larger number of perhaps narrower, better-defined mission-oriented planetary missions that will begin hopefully in the review of the fiscal year 1984 budget.

I think that we will have pursued very aggressively the immensely exciting area of astronomy and astrophysics, with the space telescope and the gamma ray observatory. In applications, I think that the commercial and civilian applications that we will look back on are ones that we can hardly even envision today.

I see a very broad space program, and I see it much broader than the space program that was characteristic of the sixties and the seventies.

Mr. FLIPPO. Mr. Fuqua?

Mr. FUQUA. Mr. Chairman, I have but one question. I want to thank Dr. Keyworth for being here this afternoon.

You have touched on, in a question asked by Mr. Flippo—and that was the extent of the OMB participation in the space policy deliberations—you indicated that their participation was not solely limited to funding, if I am paraphrasing your response correctly.

How much did they participate, though, as it relates to funding for, say, new initiatives or new programs as merit would have them?

Dr. KEYWORTH. Mr. Fuqua, the reason the space platform and the fifth orbiter were not included had nothing to do with the OMB. This was not a budget planning decision. That will occur

soon enough. It really was policy. I believe very strongly, as most other members of the administration do, that policy must drive the budget. It preceded the budgetary decision.

Mr. FUQUA. However, I do not really see in the policy—and I do not mean to say language per se, a space station or a fifth orbiter—it does not say anything about completing the fleet of the Shuttle or any type of manned presence in space, even in a general way.

Dr. KEYWORTH. Certainly, but let me interpret that as two questions and address them directly.

We took a global approach when we addressed maintaining America's role of leadership in space. I think that is much broader than the fleet. As far as manned presence in space, I think most of us—or perhaps I should just speak for myself in this case—feel very strongly that before we ask the American people to invest billions of dollars in a program that is designed solely for the purpose of manned presence in space, we should decide what man is going to do in space first. Manned presence should not be an end in itself. That key element has been essentially missing in discussions of most of the advocates who have come to see me and in the myriad articles that I have read on the subject.

I agree that the Soviets lead the United States in manned presence in space and in long-duration stays: no question. Long-duration stays have not been a major underlying requirement of current or future of the U.S. space programs. We are now taking a very detailed look at manned presence and I believe that thinking will be the major part of the planning and reasoning that goes into the formulation of the fiscal year 1984 budget submission to Congress. I suspect it will also be a major element of the congressional considerations. Manned presence is a fundamental issue but it is not by any means the entire U.S. space program.

Mr. FUQUA. I concur with that but, by the same token, would you think that if we increase our preeminence in space, what would you paraphrase that as including?

Dr. KEYWORTH. Science applications, encompassing such things as remote sensing, communications, materials preparation, promising new technologies like biotechnology or electrophoresis—all of these and more will be fundamental elements in our space program. It will also include meeting the communications and intelligence requirements of our national security, as well as the full scope of scientific programs to which I referred before.

Man's presence is not in itself critical to maintaining a first-class space program, in my opinion, at least until we understand better what the role of man will be in space, either in terms of supporting the applications program or of supporting, for example, an exploration program to Mars.

Mr. FUQUA. Well, how would you propose that we go about trying to define that? Is that something that NASA should do?

Dr. KEYWORTH. I think the entire space community, all of us here today, NASA and users, should very definitely be doing it. We should bring into the consideration not only those who are interested in the very exciting technology of man's presence but those who are very interested in the potential application. Now that there is public focus on the entire question of a space platform, I think we

can expect to see those broader perceptions in the next few months.

Mr. FUQUA. Thank you, Mr. Chairman.

Mr. FLIPPO. Would the gentleman yield?

Mr. FUQUA. Yes.

Mr. FLIPPO. Did I understand you correctly, to say that the decision on the fifth Orbiter was a policy decision and not driven by cost factors, by OMB?

Dr. KEYWORTH. First of all, no decision has been made; that issue is being discussed in the course of the fiscal year 1984 budget. What I am saying is that the fifth Orbiter is an issue that should be driven by policy; the space policy itself did not address the question of whether a fifth or a sixth or a seventh Orbiter should be built.

Mr. FLIPPO. However, Doctor, since a budget is a matter of carrying out the policy and your budget does not request any funds for a fifth orbiter, isn't your policy not in favor of a fifth orbiter?

Dr. KEYWORTH. Absolutely not. The policy in no way took into consideration or referred to or placed boundary conditions on whether the fifth orbiter will or will not be procured. That decision will be made in the course of the budgetary process that will begin in the administration in the months to come and will be concluded by the Congress hopefully some time next year. It is not a policy decision, it is a budgetary decision.

Mr. FLIPPO. Mr. Hollenbeck?

Mr. HOLLENBECK. Yes, Mr. Chairman.

Just following on that question of the fifth orbiter a little bit, do you foresee or can you foresee this administration encouraging any private sector involvement in the space program, and particularly with the fifth Orbiter? We all know there is a proposal that has been submitted by SpaceTran, and I would guess it would be logical to conclude that time will run out on their interest or their backers' interest. Do you see any encouragement for the private sector involvement, and if not, why not?

Dr. KEYWORTH. Well, in the first place, we do encourage private sector involvement. We would be very receptive to seeing a fully documented proposal, and, in general, we thoroughly encourage broader participation of the private sector. Basically that is an important way for the applications element of the space program to be adequately developed.

On the other hand, we also recognize that it does not fall upon the private sector alone to acquire the fifth orbiter. If the fifth orbiter is a necessary element to insure the health and vitality and, if you wish, continued security of the space transportation system, then the Government will have to undertake that. We are interested in the participation, but we are not relying upon the private sector to do it.

Mr. HOLLENBECK. Thank you. I just had a follow-on question on Mr. McGrath's opening remarks as to the senior interagency group which was responsible, according to the background section here, for the reports on the various issues stated and covered in the policy decisions. I note that the agencies and departments participating—this is exclusive of NASA and OMB—were State, Defense, Commerce, the Central Intelligence Agency, Joint Chiefs, Arms

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Control and Disarmament Agency. This is an overwhelming predominance of defense and national security representatives, and I am wondering if these are the people who are going to be initiating the policy that will affect our civilian space program for the rest of the decade.

Mr. KEYWORTH. Ultimately, of course, the policy of the administration is going to depend upon the President. But I certainly concur with you that the number of representatives whose interests are more oriented toward national security is greater than the number of those interested in the civilian programs. However, NASA is the primary responsible party for the civilian space program. NASA's objectives and NASA's input will be taken very seriously in any policy considerations.

It is not a vote-counting process on what the policy will be. All options from both sides will be recommended to the President, and he will make the ultimate policy decision. Therefore, whereas it looks weighted in terms of national security, I for one am not worried as long as the considerable public interest continues to support the civilian program.

Mr. HOLLENBECK. Thank you.

Mr. Chairman, in the interest of time I will have to submit my remaining questions in writing.

Mr. FLIPPO. I appreciate the consideration of the gentleman.

Mr. Nelson?

Mr. NELSON. Thank you, Mr. Chairman.

Dr. Keyworth, I remember your face. This is the first time I have seen you person to person. You were a senior at Yale when I was a sophomore. You looked a little bit younger back then.

Mr. FLIPPO. He seems to have overcome it very well. We won't hold it against you. [Laughter.]

Mr. NELSON. Did you hear what the chairman said? He says, "We won't hold it against either one of you." [Laughter.]

A while ago the chairman made this statement: "Budget is the best vehicle for implementation of policy." Do you generally agree with that?

Dr. KEYWORTH. Absolutely.

Mr. NELSON. Later on you said that you will defend each element of the budget. OK. I want you to please try to defend what is now history but that is rather confusing to me: A week before the final vote on the budget in the House, Jim Beggs called me and urged a vote for the Republican version, although the Republican version on spending, function 250—which primarily includes NASA but is called science, space, and technology as a general funding function—the position in the House was $450 million below the Senate. The figure was something around $6, $6.5, close to $7 but the House position was $450 million less than the Senate.

Jim had expressed to me the interest and the intent that when we went to conference, going to the Senate level which was $450 million more. We passed the budget, as you know. We went to conference. I was named a member of the conference committee and so as we were tidying up all the pieces, suddenly I found that instead of going to the Senate figures there was an attempt at compromise, and that what had the blessings of the White House—a la Ken Du-

berstein, the chief lobbyist for the White House—was a position that was a $200 million cutoff of the Senate figure.

Now I am rather perplexed as to why the White House would have taken that position, given the fact that a budget, in this case the first budget resolution which could have the effect of the final budget resolution for fiscal year 1983, given the fact that that was the status of the matter. If it is a vehicle for the implementation of policy, could you share with me any insight as to why the White House took that position in the implementation of its policy?

Dr. KEYWORTH. Mr. Congressman, if I understand the question exactly, I think it can be answered by saying that the original budget that the President proposed of $6.6 billion for fiscal year 1983 was a budget that supported what we felt would be the broadest and most responsible program.

Mr. NELSON. That was the Senate position.

Dr. KEYWORTH. The Senate position was the $6.6 billion?

Mr. NELSON. That is correct. The Senate position for that general funding category, function 250, for science, space, and technology, when you broke that out as it applied to NASA it was the Senate figures, not anywhere close to the House figures.

Dr. KEYWORTH. I honestly do not know why Ken Duberstein chose to support a lower figure unless it was because he felt that a larger portion of the policy components, the individual components of the budget, were covered in the House budget. However, that is pure speculation because I have not discussed it with him.

Mr. NELSON. I would appreciate any insight that you might provide. That would be most helpful.

Mr. FLIPPO. Thank you.

Mr. Winn?

Mr. WINN. Thank you, Mr. Chairman.

Dr. Keyworth, after reviewing the space policy factsheet that we have in front of us, I am concerned that there appears to be—in my opinion, anyway—a lack of definitive goals for the civilian space program. I think that is really what is behind most of the inquiries and most of the concern here. It really looks like to me that NASA is just going into the trucking business, with over half of its budget dedicated to the space transportation system.

My question is, with this large financial commitment to the shuttle program, what will be the Shuttle's role in the space science program and what about the applications program?

Dr. KEYWORTH. Thank you very much for the question. In space sciences, we will see a renewed effort in astronomy and astrophysics. This is made possible by the Shuttle and would not have been possible without it. We expect to reap great benefits from the space telescope and the gamma ray observatory for the rest of this decade.

Solar and terrestrial physics is a very exciting field of science that essentially became neglected during the seventies; I believe that neglect was because of the pressure of the planetary programs. Our planetary program will be broader and have more frequent missions, each one more bearable in cost and therefore, I believe, sustaining a far healthier planetary science program.

As far as applications, it is absolutely critical that we try to identify those potential applications that may have some promise. The

applications area—beyond the well-known ones of remote sensing and communications—to this day remain tenuous. It is very difficult to make the decisions about which way to go. Is electrophoresis going to pay off? Is float zoning of silicon going to be a practical technology? We simply do not know.

Breadth of opportunity are the Shuttle's unique quality, especially for complex, frequently serviced payloads in low Earth orbits.

Mr. WINN. Let me ask you a question: In retrospect—and we are all great Monday morning quarterbacks—with the people that you had in to get your input into the national space policy, and with the speech that the President gave, do you think in retrospect that you might want to rewrite or help rewrite some of that policy speech?

Dr. KEYWORTH. Mr. Winn, I must certainly admit one thing. If our space policy causes me to be constantly defensive, then somehow I think we did not get our point across. Yes, I think we could have written it better; yes, I think we could have written the speech for the President on the 4th of July in a certain way better.

Mr. WINN. I think you are doing a better job of explaining it, on what your directions might be and what your objectives might be, than it came out in the speech. I think the speech certainly was misleading, and I understand the concern of not only the press but people in the scientific community and the members of this subcommittee.

Dr. KEYWORTH. Mr. Winn, may I offer one word of explanation?

Mr. WINN. Sure.

Dr. KEYWORTH. In the months preceding the 4th of July speech, the amount of pressure that was exerted through the media in trying to push the President to announce the fifth Orbiter or the space operations center caused much consternation among us in the White House; it certainly influenced the way in which that speech was written. Had we gone into the issue on the 4th of July, a day of remarkable Shuttle success, without this defensive attitude, perhaps at least a few words would have been somewhat different. But I want to emphasize that I do think that the President's tone was one that was totally supportive and totally positive with respect to the Nation's space program.

Mr. WINN. I do not doubt that. I just think that it leaned toward the military side and not toward the scientific side. Practically all the way through it, it keeps referring to "national security." Now anybody that is in the field can use their own opinion and their own judgment on what we are talking about as far as national security is concerned but I think these hearings will help clarify—at least I hope that they will—clarify the differences and answer some of the concerns of the members. However, I do think that had that speech been written in a little different vein, I do not think that you would have had the pressures.

Let me also say, too, in defense of the administration, your administration is not the only one that has come before this committee with a very, very vague space policy from time to time.

Thank you, Mr. Chairman.

Mr. FLIPPO. Mr. Brown?

Mr. BROWN. Dr. Keyworth, if you are pressed for time I can defer questions.

Dr. KEYWORTH. I guess first I should ask you, will they be gentle?

Mr. BROWN. Oh, very gentle. [Laughter.]

Mr. NELSON. He has the time, if they are gentle.

Mr. BROWN. Well, if you have a few more minutes I will impose on you. Let me say first of all that I have not as much criticism of the text of the July 4 statement as I might have. There are a large number of common elements with the policy expressed there and previous policy statements, and I certainly cannot object too much to repeating language from the original act or from language in the Carter policy statements.

However, it has been pointed out in previous questions and I would point out that the statement did not satisfy a number of people because of what it did not say. It did not give the positive emphasis that many people were expecting, and it seemed to move us very far toward a military concept of space.

I will ask you specifically that point: Do you see the space program as moving toward a substantially greater role for the military in the next decade?

Dr. KEYWORTH. Mr. Brown, first, I had to be willing to stay a few more minutes considering the amount of support you have provided for the space program over many years.

I will simply say the answer to your question is: I absolutely do not. We strive very hard to create a balance; I think it is there. A careful analysis of the space policy in almost any form, including its top secret form, would validate that.

I might quote the Executive Director of the National Space Institute, itself a very much prospace citizen space group, who said that Reagan's policy is no more militaristic than directives issued by President Carter in 1978. No, I do not expect the mission fraction of military missions to become any greater in the future than it is today.

Mr. BROWN. You will admit, I think you have admitted that the senior interagency group is more dominated by the military than the previous policy group which was chaired by your predecessor. You will admit that the military budget for the first time in the last 30 years, at least, is now greater than the civilian space budget.

Dr. KEYWORTH. It is a simple fact. There are more national security oriented people on that senior interagency group than others.

Mr. BROWN. You are not fearful of that, I gather.

Dr. KEYWORTH. No, I am not, partly because of my understanding of the President's own commitment to the space program.

Mr. BROWN. Some of us are understanding of the President's commitment to the military program, too.

Dr. KEYWORTH. There are two reasons for the rapid increase in the growth of the defense program. First, only recently was there any attempt to account for the full scope of the defense programs—many of them have been very tightly classified. Second, the complexity of the military missions has grown even more alarmingly rapidly than has the complexity of the average civilian mission.

Mr. BROWN. Dr. Keyworth, I recall that when President Carter came out with a policy statement on innovation and productivity 3 years or so ago, this committee here jointly with the Senate committee was extremely critical of that policy statement, so I do not

want you to feel that we are picking on you. We picked on your predecessor, and the reasons were somewhat the same.

We said of Carter's program on innovation and productivity that it was too little and inadequate, that it did not cover all the bases. For example, it had nothing in it dealing with tax policy, antitrust policy, some of the things that this administration is very strong on, very good on.

This administration is not very good, however, in some areas relating to the role of the Government in fostering the continued competitiveness of America's civil and commercial role in the world. That is the thing that I think members of this committee are pointing to in connection with the space policy because we see space policy as being at the heart of our ability to compete globally in new technology. Do you see that same importance?

Dr. KEYWORTH. Very, very much so. Let me simply say that for the last 7 months the dominant issue of my staff and myself has been the competitiveness of our high technology industries. We are devising a family of programs that I have already submitted to the other members of the senior staff in the White House.

Let me say specifically, Mr. Brown, that I think the problem is a different one today than it was even a few years ago. The concept of a truly international economy is even more entrenched today, and the whole world looks toward high-technology industries as the growth area and as a source of new jobs. I agree with you it is absolutely critical, but we must look at the very roots of our system, of our science and technology enterprise, of how research gets from our laboratory to the marketplace, of how we cooperate internationally, and many other issues.

We have been doing this. Without exaggeration I think I can tell you that we have spent something approaching 10 manyears in my office in the last 7 months on this issue. I will go so far as to give you my promise that you will be very sympathetic with at least some of the initiatives we will be proposing in the near future. You will see evidence of our deep concern, too.

Mr. BROWN. Well, I am aware of your deep concern and I compliment you on the efforts that you are describing but let me point out one thing which you said earlier, which I think opens up the problem a little bit. You commented on the United States versus the European Community's space budget: Ours is about $12 billion, theirs is about $1 billion, I think are the figures that you used.

The problem with that comparison is that first of all, they do not have very much of a military space budget and ours is more than half military at the present time, so that brings the comparison back to 6 to 1 instead of 12 to 1. Then, within that $1 billion they focus on specific commercial opportunities, economic opportunities, which they put their national resources to exploiting. We do not. That is the problem with the space policy. It does not focus on some of the problems involving the economic exploitation, for example, the commercial development of Earth remote sensing. The policy problems in achieving that are not addressed in the space policy statement, and we have been begging for some enunciation or resolution of those policy problems which you are working on. I am sure you hope to come up with something but it has not been done yet.

Dr. KEYWORTH. Mr. Brown, you address, of course, the most difficult part of the entire competitive element: How do we compete with other economies that are not as free enterprise oriented as ours? How do we compete in particular with targeted industries such as biotechnology and microelectronics and, as you said, a subsidized space program in Europe?

It is a difficult problem of two different mechanisms meshing. We must accommodate it. There is no question. The mechanism is not one that comes out of the drop of a hat. We are looking at a family of solutions, and we look forward very much to working with the Congress in resolving what is today an even more real issue than it was yesterday.

Mr. BROWN. Let me just ask you one final thing, and we will take it up with Dr. Begg again also: You said there was the question of research in advanced communications, space communications systems, which was not dealt with because there was a military program involved in the 20–30 gigahertz field and possibly in large communications platforms; I do not know.

The question I would have, however, is whether or not the military program is classified, whether or not there will be a full and prompt transfer of the technology developments to the civilian sector, whether or not we will be able to exploit these developments—in terms of our international relations and international technology transfer—these development which you point to now as being within the sphere of the military.

Dr. KEYWORTH. First, I do not believe that the basic technology is or will be declassified. Transferring technology from the military to the civilian side a serious issue, but I do not think it has been a major problem in the past, and many of our programs attest to that. Selecting it at the right time for an initiative in the civilian program, hopefully within the private sector, will be a critical decision for our remaining competitive. Obviously, the technology to which I refer in the military sector is not one that can be literally picked up and moved to satisfy the requirements of the civilian program. But the technology is overlapping, and we must stay on our toes in the future.

Mr. BROWN. Thank you very much, Dr. Keyworth.

Mr. FLIPPO. Thank you, Mr. Brown.

Mr. Lowery?

Mr. LOWERY. Thank you, Mr. Chairman.

Jay, I have just about four questions. Would you classify President Kennedy's statement to land a man on the Moon within a decade as a policy or a program?

Dr. KEYWORTH. A program.

Mr. LOWERY. Why?

Dr. KEYWORTH. Because it had a single, well defined mission: not to retain leadership, but to simply put a man on the moon. In that sense, if you wish, a policy and a program became the same, and this could fall into complex semantics if you wish.

However, my definition of a policy is what we wrote. My definition of a program is a single objective activity.

Mr. LOWERY. It strikes me that it was more of a policy, and I guess that is the concern that I and, as you are hearing, so many of my colleagues have, that there is not more specificity. There is not

a more definitive goal than the policy that was put forth a month ago today.

Dr. KEYWORTH. If I may broaden my answer just for a second, I think that the agencies in general are better equipped than policymakers to make program decisions. What we try to do with policy is to make the guidance that will allow them to do their jobs most effectively.

I wish that we could go back and pursue a program in the same way that the Apollo program was pursued. I think that memory is one of the reasons why there are so many efforts to focus the space program in a single direction.

Mr. LOWERY. Well, admittedly the issues are more complex today than they were 20 years ago.

Dr. KEYWORTH. The program is more mature.

Mr. LOWERY. Could you amplify on the differences in space policies that the President announced a month ago, and the Carter policy?

Dr. KEYWORTH. If I may, I would rather defer that to writing, because our policy is fairly indelible in my mind but I do not have President Carter's space policy very indelibly imprinted.

Mr. LOWERY. If you would, please. That leads me into my third question. This was directed to NASA at the time of some hearings we had in June, mid-June, and now we are into August. A number of questions were directed to NASA, and ultimately I am sure went through your office at the White House because they were policy-related questions, for which we yet have no answers, in terms of fifth Orbiter and SpaceTran and the DOD relationship with NASA. I for one am anxious to get the responses back because that again sugggests a lack of clear definition in terms of what our space policy is.

Dr. KEYWORTH. I hate to be so repetitive, but I expect the program issues to appear in the President's next budget submission—the space platform, the fifth Orbiter, issues such as those. I still continue to believe that they should not have been part of the activity that we have been recently conducting.

Mr. LOWERY. Therefore, you say we will start seeing some meat on the bones.

Dr. KEYWORTH. If you wish to call it "meat on the bones," then it is a thin body. Personally, I think meat on the bones in this case would have been most detrimental to the health of the body.

However, I must say that I think the interaction between the military and the civilian sector that so many worry about is a lot better after the exercise of developing this space policy than it was beforehand, and I think it perhaps might be interesting to address the same question to Mr. Beggs.

Mr. LOWERY. I plan to.

A final question: How is the administration encouraging private sector investment into the space program?

Dr. KEYWORTH. Of course, economic considerations drive the whole issue. However, basically we have been very receptive to essentially every single element of the private sector that has expressed an interest in getting into the space program. We have provided an audience, if you wish, to hear their proposals in detail; if they seem impractical to us in terms of the Government role, we

say so. I think that most members of the private sector have been generally quite receptive to our response. Incidentally, I think that some very, very positive things are coming out, such as the Space Sciences Incorporated activity in Texas, which I think is a very sophisticated and promising activity.

Mr. LOWERY. Well, I think you sense that there is a great deal of support, not just amongst this committee but talking to my colleagues throughout the Congress and from all States, for our space program. We are on the cutting edge of technology, and technology has been largely responsible for this Nation being the leader of the world. Many of us are concerned that we may lose that. Certainly we are supportive of our efforts in the area of national security but we do not want the civilian side of our space program to be lost in the process.

Thank you.

Mr. FLIPPO. Thank you.

Dr. Keyworth, as you can tell the committee is extremely interested in policy. I think many of us are concerned that we can have any kind of policy we want but as long as the administration does not request funds for addressing these problems, and as long as the budget continues to stay down in purchasing power, then I guess many of us have to assume that we are going to have a continuation of a deteriorating competitive situation.

You mention that in 1984 perhaps we could expect some "meat on the bones." Can we expect an increase, a significant increase, a real increase in NASA funding for 1984?

Dr. KEYWORTH. I hate to admit to any unscientific superstition, but I would rather not comment for fear of compromising the outcome.

I might add one thing, if I may, that the budget that we submitted to Congress represented considerable real growth above anyone's estimate of inflation. It was not a cut budget. It was a bigger increase than occurred during most years of the last Democratic administration, for example.

Mr. FLIPPO. Well, I would suggest to you, Dr. Keyworth, that that is a rather debatable situation. I think the last year of the Carter budget request for 1982 was $6.7 billion and the Reagan budget number was $6.1 billion, that was ultimately cut another $200 million, reducing it to $5.9 billion. Then, in 1983, you requested $6.6 billion so I think there is a great deal of debate as to what inflation was but, in any rate, it is not enough to make any difference in terms of getting on with dealing with the problems, although everyone I am sure is grateful for it. However, you can certainly see the concerns that the committee has and I am sure others do.

Thank you so much for being with us today. We appreciate very much your candor and we look forward to working with you in the future.

Dr. KEYWORTH. Thank you very much.

Mr. FLIPPO. We are very pleased to have Mr. James Beggs with us, who is the Administrator of NASA. He is also going to head the U.S. delegation to Unispace.

Jim, we are pleased to have you. Please feel free to present your testimony and proceed as you deem appropriate.

STATEMENT OF JAMES M. BEGGS, ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. BEGGS. Thank you, Mr. Chairman and members of the subcommittee. I appreciate the opportunity to appear before the subcommittee to discuss the NASA view of the national space policy recently approved by the President.

Next year will mark the 25th anniversary of our legislative charter, the National Aeronautics and Space Act of 1958, Public Law 85-568. That legislation has stood the test of time and has served as the foundation for the many achievements of the Nation in civil space activities. It is rather remarkable that the basic provisions of this legislation, written within months of the first man-made object being placed in orbit, remain virtually unchanged after 25 years of the most dramatic technological change encountered by man.

The recent policy statement is an affirmation by this administration of that legislation and its objectives. It represents a very positive statement of the administration's strong commitment to the space program. The policy provides NASA with a workable framework for an aggressive civilian program which will permit continued progress in the exploration and exploitation of space in the next decade.

The policy statement recognizes the importance of the civil space program by affirming the fundamental premise that, and I quote, "the U.S. space program will be comprised of two separate, distinct, and strongly interactive programs—national security and civil." In our view, many of the other provisions of the policy serve to clarify the distinctions between these programs by clearly defining the separate, distinct purposes and objectives of these programs and establishing specific "rules of the road" for their interaction.

The policy statement renews the basic national commitment as a goal of the policy, to maintain U.S. space leadership. It specifically identifies space transportation as a major factor in the future evolution of a national space program and as one such program in which it shall be our policy to maintain world leadership. It further notes that a key objective of the U.S. civil program is to preserve "preeminence in critical space activities."

To NASA, the use of the word "critical" in this statement means that in an era of increased competition and of increasing need for fiscal restraint, the United States should commit the necessary resources and attention to those areas deemed important rather than attempting to achieve preeminence in all areas of space technology. We assume that NASA, as the responsible agency, should, in its planning process, make the initial judgment with respect to which areas are critical and will take the necessary actions to make these judgments.

The following other key objectives are established for NASA by the policy:

To conduct research and experimentation to expand understanding of astrophysical phenomena and the origin and evolution of the universe through long-lived astrophysical observation; the Earth; its environment; its dynamic relation with the Sun; the origin and evolution of the solar system through solar, planetary, and lunar

sciences and exploration; and the space environment and technology to advance knowledge of the biological sciences;

To continue to explore the requirements, operational concepts, and technology associated with permanent space facilities; and,

To conduct appropriate research and experimentation in advanced technology and systems to provide a basis for future civil applications.

NASA fully supports these objectives and feels that they provide an appropriate context for decisions on program options as they relate to other national goals and priorities.

In general, the policy recognizes the NASA responsibility to make the specific programmatic recommendations concerning which program options will contribute most to the goals and objectives established by the Space Act and the policy. This recognition appropriately provides to NASA wide latitude in the planning of space activities while leaving final determination with the established budgetary authorization and appropriation processes.

Mr. Chairman, there has been some criticism of the policy because it does not identify a major civil space initiative. NASA did not believe that the policy review was the appropriate forum for the discussion of specific programs and program options and, therefore, did not propose such discussions. It is important to NASA that the policy does not specifically restrict or limit the possible options, as did the previous policy.

However, an appropriate exception to the recognition of Agency programmatic responsibility is made by the policy with respect to certain aspects of the operation of the space transportation system [STS]. Because the STS affects many agencies, the policy provides specific guidance for the conduct of the space transportation system activities. The policy affirms the general understandings of the Space Shuttle program priorities, scheduling priorities, utilization, operational arrangements, and the relationship of expendable launch vehicles. The policy recognizes the existing institutional arrangement for the management and operation of the STS but also recognizes that at a later time, another institutional arrangement may become more appropriate.

In an environment of increased international competition, NASA supports the position taken by the policy on international cooperation and believes that there also exists the opportunity for increased international cooperation which will result in increased benefits to both parties for a smaller investment by each. In support of the policy, NASA will continue to pursue feasible joint international projects wherever this joint participation yield significant benefits to our national interests.

NASA will also provide a climate conducive to expanding private sector investment and involvement in space activities. NASA has played a prominent, although on some occasions, supporting role in the evolution of private sector activities in communications satellites. NASA will encourage and promote private sector involvement in other activities in space. International cooperation and private sector participation offer to NASA the opportunity for expanded program options and will be thoroughly evaluated.

NASA does not view the policy statement as a panacea. There remain many questions and issues associated with the civil space

program to be resolved at all levels, some resolvable within the legislative authority of NASA, some resolvable within the formal and informal interagency coordination processes such as the Aeronautics and Astronautics Coordinating Board, and others which may be elevated to the level of the Senior Interagency Group on Space established by the policy or to the President and the Congress. As indicated in the Office of Technology Assessment report on Civilian Space Policy and Applications, and I quote:

> Policy directions * * * require attention by the administration and the Congress in the form of implementing guidelines, program direction, and budget decisions—in short, a continuing followup over a number of years."

Finally, Mr. Chairman, NASA participated extensively, with the other affected departments and agencies, in the formulation of the policy. It is our opinion that the policy review conducted under the leadership of the Office of Science and Technology Policy has resulted in a sound, realistic policy which does not specifically restrict or limit NASA's activities, which establishes an additional mechanism for dealing with future policy issues within the executive branch, and which also permits NASA to continue to make significant contributions to the accomplishment of national goals.

That concludes my statement, Mr. Chairman, and I would be pleased to take questions.

[The prepared statement of Mr. Beggs follows:]

Statement of

James M. Beggs
Administrator

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

before the

Subcommittee on Space Science and Applications
Committee on Science and Technology
House of Representatives

Mr. Chairman and Members of the Subcommittee:

I appreciate the opportunity to appear before the Subcommittee to discuss the NASA view of the National Space Policy recently approved by the President. Next year will mark the twenty-fifth anniversary of our legislative charter, the National Aeronautics and Space Act of 1958, P.L. 85-568. That legislation has stood the test of time and has served as the foundation for the many achievements of the Nation in civil space activities. It is rather remarkable that the basic provisions of this legislation, written within months of the first man-made object being placed in orbit, remain virtually unchanged after 25 years of the most dramatic technological change encountered by man. The recent policy statement is an affirmation by this Administration of that legislation and its objectives. It represents a very positive statement of the Administration's strong commitment to the space program. The policy provides for NASA a workable framework for an aggressive civilian program which will permit continued progress in the exploration and exploitation of space in the next decade.

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space activities while leaving final determinations with the established budgetary approval, authorization and appropriation processes.

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others which may be elevated to the level of the Senior Interagency Group on Space established by the policy or to the President and the Congress. As indicated in the Office of Technology Assessment report on Civilian Space Policy and Applications; "Policy directions.....require attention by the Administration and the Congress in the form of implementing guidelines, program direction, and budget decisions - in short a continuing follow-up over a number of years."

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Mr. FLIPPO. Thank you very much, Mr. Beggs.

Mr. Beggs, what would you advocate as NASA's future agency role and mission?

Mr. BEGGS. I still subscribe to the 1958 Space Act. As far as the roles that it spells out, the act is still very valid and it encompasses all the things that I think we are interested in doing. As far as space is concerned that act provides direction in three areas: One is to continue the exploration of space with manned activities to find out what can be done; second is in the area of space sciences and the exploration of our solar system and the universe itself; and, third, of course, is in the applications that come out of the previous two activities, and that includes all of the currently ongoing applications work that we do.

Mr. FLIPPO. Could you tell us what specific plans NASA has in mind to expand the private sector investment and involvement?

Mr. BEGGS. I will probably forget some, Mr. Chairman, but let me try.

We are cooperating with Mr. Hanna's endeavor at Houston in trying to establish a private space booster activity and will continue to work with him. We have made available to him a couple of stages that he can begin his test work to build up his capability. We are working with him to try to ease the requirements that exist for use of our national facilities which we will continue to do. We will, of course, work with him in any way that we can in the future to have our industrial partners make available to him on a cooperative basis their talents to provide boosters. I am very encouraged by what they are doing and I hope they are successful in that endeavor.

We are exploring the possibilities of private sector involvement in Delta class launch vehicles. That is in a very preliminary discussion phase but I am hopeful that we can get some private sector interest in the Delta class launch vehicle. Perhaps, again, Mr. Hanna might become interested in that but we have some others who are interested.

We have had some preliminary inquiries from Mr. Hanna about a version of the Atlas-Centaur vehicle a private sector initiative.

That is a little tougher because there are not all that many flight opportunities however; and, as time goes on the Shuttle will become increasingly more competitive with the Atlas-Centaur combination. We would be interested in having that possibility studied further though.

We are exploring with the space communications industry the possibility of some joint activities on the future of communications technology development. I hope that we might be able to attract some private investment in our future experimental communications satellite work. We are also looking very hard at the proposal which has been sent to us on the purchase of a fifth Orbiter. That is a tough one because it contains provisions that are hard to analyze both in terms of what they will mean for the future of the overall system and in terms of their overall financial implications. However, we are continuing to look very hard at the concept and if we could reach an agreement that would make sense from the Government point of view, I think we would be very interested in having them buy the fifth orbiter.

There are a number of other activities where we have cost sharing and joint activities but the ones I have mentioned are the ones that come to mind.

Mr. FLIPPO. Mr. Beggs, you are extremely knowledgeable in this area. What do you think we ought to be doing in space 10 or 15 years from now?

Mr. BEGGS. If we had our way and if we could get the commitment of national resources to do it, I think 10 years from now we would be operating continuously, permanently in a space station. We would be on our way to developing the orbital transfer vehicle to operate from that space station to synchronous orbit. That could conceivably come along in 15 years, although 15 years is probably a little too short to do it. But somewhere in that time frame, we would have that orbital transfer vehicle; and, it would be designed in such a way that it would be reusable and possibly refurbished on orbit in the space station.

We would be on our way to at least the experimental work for the design of large structures using the space station environment and possibly have a sizeable antenna under construction, and possibly have in planning a platform or large activity under development for the geosynchronous orbit.

Beyond that, if you would give us our druthers, we will go back to a station on the Moon and possibly further exploration of Mars, using either robotics or eventually man. A lot is made about the fact that there is not a plan. It is true that there is not a written plan for the future exploration of space, planets, the universe, and all the other good things; but, if you quiz our advisory committees, for example, or if you ask most of the old graybeards—and I am afraid we have a lot of graybeards around, we are getting old— we have a plan. We can review it with you any time you want to hear it. It is not something that anyone is likely to commit to because these are long-cycle programs and it takes you 15 or 20 years to get there. The problem is that in order to get there you have to do these things in sequence. We have been doing them in sequence. We started back in 1972 with the Shuttle. That was an essential

part of the plan. We had to have that space transportation system before we could go on to the next step.

The next step at that time—in fact, we would have liked to have done it at the same time as we did the Shuttle—was the permanent facility, manned or unmanned, but eventually manned. We did not get that simultaneously but we always expected that that would come along in due time, and I do believe it will come along in due time.

Mr. FLIPPO. Thank you.

Mr. Hollenbeck?

Mr. HOLLENBECK. Mr. Beggs, when Mr. Lowery was here he asked the question of Dr. Keyworth concerning the difference between this space policy and the one under the prior administration, and Dr. Keyworth said that he would prefer to answer that in writing which I can understand. Are you familiar enough with the old space policy to give us a comparison?

Mr. BEGGS. Yes; there are two fundamental things that I think are very important differences between the previous policy. There is a lot, Mr. Hollenbeck, that is the same. As a matter of fact, some of the words are even the same because times have not changed. Many of the things that were cited in the previous two documents which came out during the Carter administration were cited in this policy document. But, one thing that is quite different in terms of what was there and what was here was the one that I mentioned in my statement.

The document that came out in 1978 explicitly said that at this time or during the period covered by the policy—I think it referred to Apollo—new initiatives of that type are neither feasible nor necessary. This policy statement very definitely not only does not say that, it implies, at least in my mind, that new initiatives are permissible and welcome. Indeed, one set of words in this new statement is particularly pleasing to us. It says, "to continue to explore the requirements, operational concepts, and technology associated with permanent space facilities," and that is different from the previous policy, obviously. That is a very major difference in our eyes. Finally, it creates a different mechanism for policy coordination within the National Security Council which I view as a real opportunity to bring to the fore, if you will, these new initiatives. As they come up, we will have a forum to discuss them and to exercise the pros and cons of new ideas and new initiatives.

I think those are major differences and they are very important to us.

Mr. HOLLENBECK. Well, I know while the door is open for new initiatives, many of us are concerned that outside of the space station concept, the only other stated new initiative is the antisatellite development and deployment, as near as I can tell. Is that considered new?

Mr. BEGGS. That is not new. That was in the previous statement.

Mr. HOLLENBECK. Well, that is the only other initiative.

Mr. BEGGS. The difference between this statement and the previous statement was that the previous statement said that we would develop that ASAT capability to operational capability if our negotiations broke down. Obviously, our negotiations have broken down and we have decided to develop it to operational capability.

Mr. HOLLENBECK. My question really, though, is that although within the agency you have a lot of farseeing people and have a lot of potential projects and policies, does it concern you that they are not outlined in any detail in this policy statement?

Mr. BEGGS. No. In my eyes, policy is not program and program is not policy, although Mr. Lowery asked a question of Dr. Keyworth just a few minutes ago in which policy was encompassed in a program, and that is the Apollo program. Obviously, the policy that was implied in the Apollo program was that we were going to regain leadership in space, and that is a policy. However, my experience, both in Government and in industry, is that you try as best you can not to confuse policy with program and program with policy because if you do, you find—particularly if you do the latter, confuse program with policy—that you end up doing funny things to your policy.

Mr. HOLLENBECK. Thank you. That is a good clarification. I was going to try to have you expand on Dr. Keyworth's answer.

Many of us are concerned with what we see as the military implications of the policy, and there has been some European criticism of the shuttle as serving—as they perceive it—in an aggressive military role. I believe that this policy serves to reaffirm their beliefs, whether they are right or they are wrong. Those are their beliefs. I wonder if you could address this concern of mine and of others, not only in this committee but in the Congress?

Mr. BEGGS. The Soviets have been trying to pin on us the idea that the Shuttle is primarily a military vehicle ever since the Shuttle was initiated. It was the policy as I understand it from the beginning of the shuttle program that the Shuttle would eventually become the primary means of space transportation for the United States, both civil and military. Therefore, it did have a military role in that sense from the beginning, although it is by its nature only transportation. As someone put it, it is a truck and it will haul anybody's cargo into space. It makes sense to make it the primary vehicle because, since it is an expensive vehicle from the point of view of putting in the infrastructure, the basic things to make it work, the more you can fly it the lower the cost for any individual flight, so it makes sense to make it the overall vehicle.

In my eyes, the job that NASA has in that transportation system is simply to operate a transportation system. I really do not care what cargo they put on that transportation system providing that someone certifies that it is proper to fly. In my eyes, the U.S. military program is one that fully complies with all of the treaty obligations we have towards the military use of space. We have observed the letter and the spirit of those treaties ever since they have been signed, so I have no particular problem with what we have done. Insofar as NASA is concerned, in its relationship with the military, we work quite closely with the Department of Defense in the sense of insuring that the cargo they want to fly on the Shuttle is properly handled and their classification procedures are observed; but, beyond that, they do not interfere in my business and I do not interfere in theirs.

I would like to add one other thing, Mr. Hollenbeck. There has been a great deal of confusion, I think, about the amount of use that the military is going to make of the Shuttle. Here is our latest

manifest for the Shuttle, which goes out to 1987. If you count the number of military missions that are being flown on the Shuttle, out of the total manifest through 1987, it is about 20 percent or one-fifth. I think that is important to keep in mind.

Mr. HOLLENBECK. Mr. Chairman, do I have permission to submit further questions in writing along those lines?

Mr. FLIPPO. Without objection.

Mr. HOLLENBECK. Mr. Beggs, just a quick question: Without asking you to comment on the merits, what is the status or the posture of the private proposal now that you have received with regard to purchasing the fifth orbiter?

Mr. BEGGS. They submitted a new proposal to us which came in, I guess, about 6 weeks ago or thereabouts which changed some of the previous financial arrangements that they had proposed. We are about to enter into some discussions with them sometime this month to see—as the previous proposal described, if they were willing to enter into negotiations. We are about to talk to them to see whether we can arrive at some ground rules as to where we stand and where they stand with respect to those financial arrangements.

As you say, it is kind of a sensitive, proprietary proposition. I would not like to get into the details of their proposition.

Mr. HOLLENBECK. No, and that is why I am not asking you. Thank you.

Mr. FLIPPO. Thank you.

Mr. Nelson?

Mr. NELSON. Good afternoon, Mr. Beggs.

Do you think we need a fifth Orbiter?

Mr. BEGGS. Yes, sir.

Mr. NELSON. How about a sixth?

Mr. BEGGS. Probably, but I would rather get by the fifth before you pin me down on the sixth.

Mr. NELSON. Well, so would I, so the question that I am prompted to ask is, if we need a fifth Orbiter, why don't we have some evidence that it is going to be in the 1984 budget? It slipped from the 1983 budget.

Mr. BEGGS. I have not yet had any discussions with the OMB on the fiscal year 1984 budget. They have been more or less preoccupied with the fiscal year 1983 budget.

Mr. NELSON. All right. If it is in the 1984 budget, what we have done is, have we not slipped some of our maximum efficiency of production?

Mr. BEGGS. Not yet. We have been very carefully preserving that option by the use of spares buys.

Mr. NELSON. I am sorry?

Mr. BEGGS. Buys of the spare parts. We have been using that spare part money to buy enough of the long lead-time items to keep our suppliers open. There will come a time, in my judgment, probably towards maybe the end of this year or thereabouts, that unless we have some indication that we are going to proceed and are able to again use the money we have for spares to preserve the option even into the 1983 time period, we will run out of time. Then the price goes up.

Mr. NELSON. Therefore, if you decide at this particular point in the future that you are talking about that you do want a fifth orbiter and it goes in the 1984 fiscal year, then you are convinced that you have been able to maintain your maximum efficiency and you will not have a tremendous loss of dollars because of a shutdown on production.

Mr. BEGGS. I think so, Mr. Nelson. Building vehicles like we are building these is not a very efficient way of building vehicles. I have to admit that. However, we decided to do it this way and I would not gainsay that decision by the folks who came before because in developing a machine of this type which is right on the edge of technology, they were better off producing them in sequence so they could learn as they went along.

Therefore, I think the decision was sound, but building them the way we decided to build them, where we are changing things between vehicles, is not the most efficient way to build flying machines. The best way to build them is to buy everything at once and build them all at one time, so in that sense going along in sequence, building one after the other is kind of an inefficient way of operating. But it is infinitely better than allowing all of your suppliers and subsystem manufacturers to go out of business between each orbiter. We have managed to hold those folks together to the large extent between the delivery dates. As you know, the third one will be delivered next year a d then the fourth one will be delivered late in the 1984 time period. Even if we ordered the fifth one by the end of the year—which we will not do—it probably would not be delivered much before 1987. So, we will have a gap there in terms of the sequential delivery of vehicles. That does not bother me particularly because we will probably be laying up one or another of the four we have for modifications in that period. So, we will have a continuity in there for the Rockwell people who are working on the assembly process in that that will keep a fairly steady employment level. However, if we lose another year or so then we are going to have a problem in that the suppliers will go out of business, the assembly line will shut down, and we will have to reinitiate. That would be expensive.

Mr. FLIPPO. Thank you.

Mr. Winn?

Mr. WINN. Thank you, Mr. Chairman.

Mr. Beggs, what is going to happen to the planetary exploration program under the new policy?

Mr. BEGGS. I think it will continue in much the same way it has continued in the past, which some would describe as very lean and others would describe as adequate.

Mr. WINN. Do you have any new starts scheduled for 1984?

Mr. BEGGS. We are going to propose a Venus Mapper as a new start.

Mr. WINN. Is that the only one?

Mr. BEGGS. That will be the only near-term one; yes, sir. Beyond that we are looking at a number of others. Another one that folks are interested in is to go to Saturn with a system similar to the Galileo, which would be a very interesting mission. There is a desire to take a look at an asteroid or maybe a couple of asteroids, and we are looking at that one.

These missions have gotten very expensive over the years and as a consequence you can only wedge one at a time into the budget. In the early seventies when the Apollo program concluded, they got a number of new starts which, as you know, we are flying on now. However, I think, the prospects for the future are that we are going to have to do these one at a time, and we will be flying them over time. There will be some periods when we will only have one in the pipeline.

I should say, Mr. Winn, we are doing a number of other things, as Dr. Keyworth mentioned, in the science area that are quite important: the Gamma Ray Observatory, which from the scientific point of view is a very important mission and a quite inexpensive mission; a number of the Explorer class scientific missions which are, in a sense, very, very valuable from a number of standpoints. Therefore, we are doing a lot of science and as a matter of fact, in the fiscal year 1983 budget the space science budget was the one that got the largest percentage increase in the Agency; but, we would like to do a lot more. That budget has not been such that we could do all the things that the scientists wanted to do and I think that over the past 5 or 6 years, that budget had been steadily whittled down. We need to address that and we will be addressing it.

Mr. WINN. I think that the committee has obviously expressed its concern. The science community has expressed its concern. It is obvious that we are not going to be able to try to do all the things that the scientific community wants until we get the cost of the shuttle down, and I doubt that that is going to be possible by 1984. Therefore, really what I read into your statement is that we would like to do a lot of those things but we just do not have the money and probably will not have it again in 1984.

Mr. BEGGS. Yes, we will not have the money to do everything. Obviously, we will not have the money to readdress all of the things that we have not done for quite some time. As you know—we have discussed this before—the difference between what we had in the early 1970's and what we have now is quite a lot and we are not going to make that up quickly. However, from the way I read the sentiment in various places, we will be able to get a new start or two in the next couple of years. I think we will start to build the space science budget back up and start doing some of the things that have been postponed. I wish that it could be as much as my science constituencies would like to have. Unfortunately, it is not going to quite be that good but it will not be all bad, either.

Mr. WINN. Thank you very much.

Mr. FLIPPO. Thank you, Mr. Winn.

Mr. Brown?

Mr. BROWN. Pursuing that for a moment, Mr. Beggs, Dr. Keyworth also indicated that there would be constraints on the science program and planetary explorations, and suggested that we would have to settle for smaller or simpler, less expensive missions and possibly have a few more of them. I presume that is what you are referring to.

Mr. BEGGS. Yes, sir. The Venus Mapper that I referred to is not the Venus Orbiting Imaging Radar [VOIR] which had been planned before; it is a less expensive proposition that we think will get a

substantial percentage of the science that we would like to have but at a lower cost.

Mr. BROWN. Would it be possible for you to give us in writing an indication of the kinds of things that are being considered over the next 4 or 5 years, or is that beyond your——

Mr. BEGGS. I can give you kind of a generalized list; yes, sir.

[The information follows:]

The Solar System Exploration Committee, a group of noted planetary scientists, has been established to develop a long-term balanced mission strategy for exploration of the solar system and to recommend an affordable approach. Some of the techniques that are under consideration to minimize the cost of planetary missions are to focus the mission science objectives on specific limited questions, to maximize the inheritance from previous missions, to utilize off-the-shelf designs for some spacecraft components, to develop instruments which can be used on several missions, to optimize the planetary mission sequence in order to increase the operations efficiency, and to share operations between missions to the maximum extent. A potential future new initiative being considered is called the Venus Radar Mapper Mission which will have limited science objectives, inheritance from Voyager, utilization of Voyager off-the-shelf designs, and possible sharing of mission operations.

We are assessing the feasibility of modifying production line earth orbital spacecraft for planetary missions; we are also considering developing a set of modular planetary spacecraft which would be used on a series of inner planet missions, for planetary probes, or to the small bodies and outer planets. In addition, we are studying the feasibility of establishing a series of missions called Observers which will be relatively low cost, have limited objectives and high inheritance, and which can take advantage of unique flight opportunities. We have been discussing possible cooperative solar system observer missions with a number of countries.

In addition to the potential Venus Radar Mapper Mission, the missions we have been considering for the next 4 or 5 years include a Mars Climatology/Geochemical Orbiter, Lunar Resource Orbiter, Comet Rendezvous, Asteroid Rendezvous, and a Saturn Probe. Until we receive the recommended mission list from the Solar System Exploration Committee, we will make no decision on the next focus for planetary exploration.

Mr. BROWN. From the standpoint of one who is concerned very much about both science and planetary exploration, I would like to know a little bit about the kinds of thinking that you are doing and what its impact would be from a budgetary standpoint and so on. I think it would be helpful if you could submit that for the record.

On a different subject, do we have any reliable information as to the amount of resources that the USSR devotes to its space program?

Mr. BEGGS. I really do not think there is a good estimate right now but I am not sure of that. I have asked for a comparison as to what the Soviet Union is spending vis-a-vis our program and the rest of the world, and I cannot get a real reliable figure on that. I would suspect, from the fact that what you can see is very impressive—they have been operating continuously in space stations, the latest being the Salut 7, which is quite a large piece of equipment. They have men up there now and it appears that they will continue to occupy it. That requires a substantial infrastructure for supply and to get the men back and forth. They just took three men up to visit and returned them. That is a substantial effort. I suspect their program is very large.

Mr. WINN. We know the number of spaceports that they operate and we know the number of launches they make, do we not?

Mr. BEGGS. Yes, that can be monitored. As you know, they had over 100 last year, which is a very impressive number of launches.

They are spending a lot of money, I would say at least as much as we are spending on the civil and military budget combined.

Mr. WINN. That is a very respectable figure. The cumulative number of launches that they have made through the life of their space program is almost double what we have made, according to the figures that——

Mr. BEGGS. Yes. I do not worry about that one particularly, since their technology of the spacecraft is significantly behind ours. We make fewer launches but I think we are accomplishing as much as they are and maybe more. Certainly, our scientific probes have been far more advanced and far more impressive in terms of results than theirs have, so I do not worry about that so much.

I do worry about the fact that they appear to be continuing to move ahead, both in number of launches and in the activities that they conduct.

Mr. FLIPPO. Mr. Brown, you might want to direct your question to anyone else in the room that might have information about what the Russians are spending. If you wanted to, maybe we could get some information.

Mr. BROWN. Do you want to call the witness?

Mr. FLIPPO. No, sir. [Laughter.]

Mr. BROWN. A couple of other points that of course are of continuing interest to us on the committee: As you know, NASA went through a stage where it produced all of the basic research on communications satellites and then it dropped out at a time when it was thought the technology was mature. I think that was around 1977 or something like that. Then the rapid developments in the field necessitated that it get back in, and you probably have the years and the numbers there.

Then the question of increasing traffic and the saturation of the geosynchronous orbit and other things made it clear that we needed a subsequent generation of technological development, and now I understand—I guess Dr. Keyworth said something about it—that apparently the military is doing a good deal of the research on the 20–30 gigahertz system technology and possibly, although I do not know, on the large communication platforms which may be the wave of the future in communications satellite technology.

The question that I have has to do with the coordination of the policy between NASA and the military in areas of this sort. We do not do a very good job on coordinating policy in the Congress because we do not always know what is going on in the Armed Services Committee and they do not know what is going on in this committee, and we do not even try to find out sometimes. At least you do not have that problem because basically policy ends up in the office of the President.

However, my specific question is, Are we adequately coordinating the policy development in the advanced communications satellite area? Are we getting the civilian benefit of the R&D which the military may be doing for military purposes? Are there areas here which need further attention by a better policy effort on the part of the Congress?

Mr. BEGGS. That is a difficult question to answer, as you well know, Mr. Brown. The military is doing quite a lot of technology development in their program in the 30/20 gigahertz range. As Dr.

Keyworth mentioned, they do have a program. The technical transfer of that information, I think, takes place naturally in the economy. It is not something that you can prevent from flowing into the civil side. For example, if someone develops a traveling wave tube in the 30/20 gigahertz range, the engineers that develop that are going to be able to develop the same tube and manufacture the same tube, and it can be plugged into a civil communications satellite. Therefore, that transfer takes place almost automatically. It happens.

The same is true of low-noise receivers and the switching systems that you have to have. Those things will fall out of the military program in a very natural way. The real question that concerns the NASA part of this program is: "Are we bringing these technologies together in a timely fashion so that we maintain our competitive lead?" That is a difficult issue right now because the place that I find competitors have gone to try to outdistance us are the areas that are, of course, of greatest economic benefit. They have come after the communications satellite market which was previously our monopoly; and they are moving into the remote sensing area, both the French and the Japanese, which previously was our monopoly; they have moved into the launch services area, which was previously our monopoly. Those are the areas where the money is. So, it is obvious these are the areas on which they are going to put their greatest emphasis.

Now the technology is moving fast in the communications satellite area. That area is moving so fast in terms of its development—it is the fastest growing commercial area in the world and growing at perhaps 20 percent a year, and every nation wants a satellite of their own—that you have to keep pushing the technology in order to use the spectrum most efficiently and in order to use the geography most efficiently. The question we keep asking ourselves is: "Are we going to bring that technology together quickly enough so that our industry—both on the equipment side and on the service side—stays ahead of the rest of the world?"

Mr. BROWN. Well, you understand the problem. What bothers me is, take communications satellites which is relatively innocuous, so a traveling wave tube for 30/20 gigahertz is developed and for some reason or other the policy people in the military feel that this is a technology which they should keep under wraps for a while because we have this hemorrhage of technology that has been referred to that benefits our opposition around the world, whether it is military opposition or commercial opposition, so we keep it under wraps.

Now that is a policy decision made, we will say, by this senior interagency committee which is dominated by the military, and if it is taken up at all it is taken up in the Armed Services Committee which is very sympathetic to the military. However, the members of this committee and maybe a majority of the Members of Congress who are concerned about the continued economic viability of this Nation do not get an opportunity to have an input into that policy decision. How do we handle that problem?

Mr. BEGGS. In my judgment, there is no way that they can put that technology under a bushel basket. For example, if a company that is in the business of developing and manufacturing traveling

wave tubes and if someone comes along and says, "I want to buy one in the 30/20 gigahertz range," they will say, "We will sell you one," and they will get it.

There are certain things that you can keep under classification wraps but technology of this type, in my judgment, will get into the commercial sector. Again, I think the major issue is not the bits and pieces of individual technology; the switching systems, the transmitters, the receivers, the other components will move into the commercial arena. The real question is whether you are capable of integrating those into a system. The systems problem is one that is very serious, if you are going to integrate them into the system and fly them in a timely enough manner to where the service industry will stay ahead of the rest of the world. The service guys will wait until someone comes along and says, "Look, I have this whole thing wrapped around and integrated into a spacecraft and I can sell it to you for x millions of dollars." Then, they will do their sums on the financial benefits of that and the cash flows and so forth, and they will either say, "Yes, that is a good idea," or "No, it isn't." It is that phase that you have to get over, and that is the one that we are worried about.

Mr. BROWN. Well, I appreciate your answer but I am not completely reassured by it because, as you know, the problem exists in spades in the other area that we have mentioned, earth resources observation, and I am not satisfied that we are grappling with the problem with full and adequate weight being given to the diverse factors that occur here.

I think part of the problem with the policy statement is, it did not reassure us that these policy problems—which, as I say, exist both in the Congress and in the executive—are being adequately dealt with in the total national interest. I think that is what bothers this committee as much as anything, and I will not belabor the point.

Mr. BEGGS. I do not mean to disagree with you at all, Mr. Brown. I believe it is a serious problem. The issue of how we keep this country ahead in those areas where we have, over the last 25 years, had a lead on the rest of the world, is a very, very serious issue. It is one that I know that Dr. Keyworth and his staff have been wrestling with and it is one that we are very much concerned about in NASA.

The other part of the question reflects into that business of how do you make sure that the industry has access to that at a very early point so that they can move out and make it commercial. One of the problems that I think we have had is that we have not brought the commercial sector in early enough so that they can make use in an effective way. That is one of the initiatives we are trying to come to grips with: How do we involve them in the technology program at a point in that technology development that will enable them to move out quickly and get a lead on the rest of the world?

Mr. BROWN. Thank you very much

Mr. FLIPPO. Thank you, Mr. Brown.

In connection with that, you mentioned earlier about the Atlas, perhaps. Do I understand that NASA and the White House would

support commercialization of a launch vehicle to compete with the Ariane?

Mr. BEGGS. Sure. It is going to be. And, we have had some discussions about that. The problem with that one and I am, I guess, probably at least one of the experts on Atlas and Atlas-Centaur as far as commercialization, is that when you look at the next 10 years—which is what you have to do if you are going to try to make a commercial venture out of it—is that you have the competition from the Shuttle, which is building up flight rate and which can handle anything that the Atlas can and probably do it more efficiently and cheaper. Therefore, you are dealing with the offload on the Shuttle, which is what the Ariane is going after as well, and then you are going to have to compete with Ariane for that offload. It is just a very, very difficult business proposition. I could never make a business deal out of it, Mr. Chairman, but I hope somebody else can.

Mr. FLIPPO. However, the Ariane is by some standards and some definitions is subsidized. Would that mean that this commmercial venture would be—would they have the assets available.

Mr. BEGGS. You have to remember a couple of things. Ariane is right at the beginning of its learning curve, which means it is high-priced. They are not doing it in the easiest way, either. They have it farmed out all over Europe, so that makes it even higher priced. My general experience with aerospace manufacturers in Europe is that they are more expensive, sort of a priori, than American aerospace manufacturers. My European friends might argue with that but that is my experience. Therefore, Ariane is very high priced at the front end of the learning curve. The Atlas is way down on the learning curve. We know how to build it and how to handle it. Second, the Ariane is operating 5,000 miles from the manufacturing site, across the Atlantic Ocean in French Guiana, and all of that infrastructure has to be created. It has to be checked out. They have launched four and had three successes. It is going to be awfully expensive. They have to overcome through subsidy that very sizeable difference between the cost of the vehicle itself and the costs of the operating procedure that they are employing. I think you could get competitive but you have to answer other questions, which are in the long term, because if you are going to go commercial you cannot plan on just operating for a couple of years. In the long term, you have to be commercially viable.

Mr. FLIPPO. Chairman Fuqua?

Mr. FUQUA. Thank you, Mr. Chairman.

Jim, outlined in the President's space policy, the senior interagency group, is that another layer of bureaucracy that you have to go through in order to effectuate new policy? For instance, if you have a new initiative in NASA, does it have to be approved by that group before you go to OMB and the President, or——

Mr. BEGGS. No; it is my understanding that it is not intended to operate that way. The ground rules for that interagency group are just being drawn. I view it as being a real plus as far as NASA is concerned because it will enable us to raise issues that need raising in an appropriate forum. Much has been made of the announced composition of the group and what the balance is. Whether the Arms Control and Disarmanent Agency is a military agency or not

is an open question. I never thought it was supposed to be but maybe it is. However, if you look at it as a nonmilitary agency, then there is an exact balance but that is kind of immaterial because the group is made up of individuals; so, they are to be sitting in that group as individuals. It also says that on any particular issue—and I assume this is mostly the NASA issues—we can invite other interested agencies and I would certainly intend to do that.

Mr. FUQUA. I was not as concerned about the makeup, per se, as I am that it would be another group that would inhibit the ability of NASA to initiate or to have new initiatives, or another bureaucracy that you had to go through to do that.

Mr. BEGGS. Although I have not had any lengthy discussions with Judge Clark on this, I am absolutely positive that he does not want to make that into another layer of bureaucracy. He simply does not have enough time to do that.

Mr. FUQUA. I would certainly hope that it would not be an impediment to the initiation of new initiatives by NASA and also budget problems that you may have.

Mr. BEGGS. Yes, sir. The first indications that I have are that they are going to be helpful and I think that they will be helpful. I do not think they are going to get in the way. They certainly have not indicated to me that any new initiative has to be cleared through them before I can take it into the budget process and we have not assumed that.

Mr. FUQUA. I certainly hope that your assumptions are correct.

Mr. BEGGS. I have enough trouble with OMB.

Mr. FUQUA. Thank you, Mr. Chairman.

Mr. FLIPPO. Thank you, and thank you, Mr. Beggs, for you testimony.

We are going to take a brief break and go to vote and come back, when we will receive the testimony of Dr. John Gibbons, who is the Director of the Office of Technology Assessment. They have just concluded a very important study and we will be looking forward to his testimony at that time.

[Recess taken.]

Mr. FLIPPO. The committee will come to order.

We are very pleased to have Dr. Gibbons with us today and we apologize for the delay. Please feel free to file your complete statement for the record and summarize as you deem appropriate. It is good to have you with us.

STATEMENT OF DR. JOHN H. GIBBONS, DIRECTOR, OFFICE OF TECHNOLOGY ASSESSMENT, ACCOMPANIED BY RAY WILLIAMSON

Dr. GIBBONS. Thank you, Mr. Chairman. I would appreciate filing my complete statement for the record. Mr. Chairman, I am accompanied today by Dr. Ray Williamson, who directed our study on civilian space policy and applications.

We appreciate this opportunity to testify on national space policy. I would like to anticipate my later discussion of the policy statement by noting that the Reagan policy as revealed in the White House fact sheet of July 4 contains few substantive changes from previous policy. The most important modifications of earlier

policy statements are a somewhat greater emphasis on national security programs and a disinclination to commit the Government to operational systems. The administration's report is more notable for failing to address certain pressing problems of policy formulation and implementation than it is for stating new goals or strategic policy directions.

My testimony will consist of two parts: First I will summarize the major findings of the recent OTA report, and then I will provide a few comments concerning the President's space policy.

In the OTA assessment we investigated America's civilian space policy from the point of view of its effects on four primary areas of space applications technology, including space transportation. More than 100 experts from business, Government, the university community, and public interest groups participated in OTA's project.

The current situation in space, Mr. Chairman, can be summarized as follows: The increasing domestic institutional and fiscal constraints, as well as the rapid growth of foreign competition, present Congress with four key issues of national strategic policy concern. First, what is the appropriate division of responsibility between the Federal Government and the private sector in funding or otherwise encouraging civilian space applications research, development, and demonstration? Second, what entities should operate space systems once they are developed and demonstrated? Third, what is the most appropriate relationship between the civilian and the rapidly expanding military space programs? Fourth, what major new space projects, if any, should the U.S. embark on after the space shuttle, that is, what specific projects best match the goals and strategies?

In exploring these issues, OTA repeatedly encountered two disturbing realities: First, competition from newly operational European and Japanese systems is beginning to threaten U.S. leadership in commercially profitable space technology. The United States already spends far more on space than do Europe or Japan but aggressive foreign programs that are focused on commercial ventures are better designed to respond to the growing marketplace for space services, it seems to us, than is the U.S. program.

Second, the challenge of meeting foreign competition is aggravated by the absence of agreement within the Federal Government about the future direction or scope of the U.S. civilian space program. For space applications in particular, lack of agreement on appropriate goals has made it very difficult for the executive agencies to develop space systems to meet user needs, to transfer technology or otherwise encourage private sector investment, and to initiate new programs or implement mandated ones.

The U.S. space program is technologically capable but it must develop more flexible policies and institutions to meet changing conditions. To that end, it is important for the Government to enlist a greater share of private resources in space technology. A great part of the success of the European and Japanese programs results from their institutional arrangements within which the public and private sectors can work well together.

Although an increased role for the private sector is important, we certainly must not lose sight of the fact that the Government continues to retain a crucial function in at least four areas that are

essential to the Nation's future in space. Those are: contribution basic research and development, support of space science, provision of public goods and services; and the regulation and coordination of national efforts, particularly with respect to international agreements.

In our assessment, Mr. Chairman, we examined four space applications technologies. These were: satellite communications; satellite land remote sensing; space transportation; and materials processing. These specific analyses provided us with a means to examine the more general issue of policy and goals. The results of those analyses are summarized in my written testimony, Mr. Chairman, and so I will not go into detail on those unless you care to in the question period.

I would now like to turn to a few comments on the administration's national space policy as was disclosed in the White House fact sheet.

The introduction states basic goals and principles of U.S. space policy; they represent little change from the goals and principles of the 1958 NAS Act or the policy of the previous administration. This section places a stronger emphasis on national security than do any previous policy statements and it highlights the U.S. opposition to any restrictions on national security programs. The ninth and last principle enunciated is the only new one, and it states that: "The United States will continue to study space arms control options," and will consider arms control measures affecting the testing and deployment of specific weapons systems. However, it makes no commitment to specific measures or to negotiations.

Section 2 repeats the longstanding intention eventually to replace expendable launch vehicles with the shuttle. OTA has pointed out that the policy of phasing out ELV's has prompted ELV manufacturers to reduce their production, and this reduction in turn leads to a sharp increase in the cost of domestic ELV launches. If ELV's, particularly the Thor-Delta and the Titan, were allowed to be sold and operated by the private sector, this could provide the United States with several immediate advantages: competition for the French Ariane; added incentives to NASA to bring down the costs of shuttle operations; and a backup to the Shuttle for all users, civilian and military. It was interesting to hear from Administrator Beggs a few moments ago concerning NASA's activity in this area.

Section 3 of the fact sheet, Mr. Chairman, discusses the civilian space program and includes four program goals and four paragraphs concerning policy. The goals differ in a number of significant ways from previous statements. For example, the fact sheet makes no commitment to Government operation of space systems. It also appears that a more limited range of applications will be pursued. The question of an ambitious future central project is addressed but not decided. The possibility of a permanent space facility is left to continued examination.

On the issue of private sector involvement, the second principle states that "The U.S. Government will provide a climate conducive to expanded private sector investment and involvement in space activities," but it fails to indicate how this might be done or in what areas it might be done. In our view, policy guidance for land

remote sensing is long overdue. The needs of both foreign and domestic data users make it essential that the continuity of data for Landsat or a replacement satellite be maintained. However, at the present time it is unclear whether the United States will have any civilian land remote sensing capability after 1985 and perhaps earlier than that. OTA identified several options for maintaining data continuity, including private ownership, international ownership, or continued Government ownership. If the Landsat program is to be transferred out of the Government, planning should be done now. Otherwise, after 1985, U.S. customers may find themselves constrained to purchase data from the French Spot system, since that would be the only operational system.

I will skip my comments on other sections of the President's policy, Mr. Chairman, and turn to a few concluding remarks. It seems fair to say that, compared to past space policy, the Reagan national space policy makes few substantive changes. It reflects a somewhat greater emphasis on national security programs than past statements, and a corresponding reduction in priority and scope of civilian operational systems.

The policy explicitly commits the Government to developing an antisatellite system but it leaves the question of a space station unresolved. What seemed disturbing about this new policy statement is the fact that a number of serious problems having to do with inadequate institutional support, lack of long-range goals, and poor coordination and implementation of policy, remain unaddressed. Of the major problems identified by OTA in its study, most are either ignored or exacerbated.

For instance, on the issue of commercialization, the fact sheet makes no statement about specific policy or about specific systems, particularly land remote sensing. There is also no indication whether some or all civilian systems should, as a matter of policy, remain in the Government and, if so, under what circumstances. The increasingly evident inability of the space shuttle capacity to meet the needs of domestic users during the 1980's is likewise not addressed.

With regard to foreign space programs, the policy fails to recognize the need to meet rapidly rising competition, nor does it mention the concrete prospects for mutually beneficial cooperative ventures, either in remote sensing, in the development of the space transportation system, or in space station planning. It does not discuss the political or the commercial pros and cons of aid to developing countries or those importance to the United States of improved planning for the meetings of international organizations that have to do with space.

Incidentally, Mr. Chairman, we are—as requested by your committee—in the process of an assessment on international cooperation and competition in space.

Finally, Mr. Chairman, because of the composition of the senior interagency group, several civilian government agencies and the U.S. private sector will have no established means to participate in space policy formulation and implementation. By the same token, the military and intelligence community have been given what we see as unambiguous control over space policy decisions.

The result of the Reagan policy review raised the following questions: Why was it undertaken? What problems was it meant to resolve? Why did it fail to address issues of central importance? The answers to those questions are beyond the scope of our analysis but what is certain is that the important problems are simply not going to go away. In light of the need to address those issues that the President's policy statement did not consider, the Congress may wish to take a more active role in developing national space policy.

To aid in this effort, it may also be appropriate for the Congress to obtain information and advice from representatives of all the major communities interested in space. Several possible mechanisms for this process are covered in our report. They include holding cooperative hearings between committees with jurisdiction over military and civilian space activities; reestablishing a new version of the National Aeronautics and Space Council or setting up a National Commission on Space that would include congressional representation.

Mr. Chairman, I would offer the summary of the OTA study if you would care to enclose that for the record, as well.

[The OTA summary mentioned above will be available from committee files.]

[The prepared statement of Mr. Gibbons, plus the OTA study mentioned above follow:]

Final

Oral Testimony

Statement of Dr. John H. Gibbons

Director

Office of Technology Assessment

to the

Subcommittee on Space Science and Applications

of the Committee on Science and Technology

U.S. House of Representatives

August 4, 1982

National Space Policy

I am accompanied today by Dr. Ray Williamson who directed the recently completed OTA report, Civilian Space Policy and Applications. We appreciate this opportunity to testify on National Space Policy. I want to anticipate my later discussion of the policy statement by noting that the Reagan policy, as revealed in the White House Fact Sheet of July 4 of this year, contains few substantive changes from previous policy. The most important modifications of earlier policy statements are a somewhat greater emphasis on national security programs and a disinclination to commit the government to operational systems. The Administration's report of its policy review is more notable for failing to address certain pressing problems of policy formulation and implementation than it is for stating new goals or policy directions.

My testimony today consists of two parts. First, I will summarize the major findings of the recent OTA report. Second, I will analyze the President's space policy in light of the nation's critical needs in space.

The OTA report is the result of a broad, independent assessment of this nation's space policy. This assessment was requested by the Senate Committee on Commerce, Science and Transportation, and endorsed by the House Committee on Science and Technology. With your permission, Mr. Chairman, I offer the summary of the report for the record.

The OTA assessment proceeded from the premise that the existing policy framework, articulated in the 1958 National Aeronautics and Space Act, should be reviewed in the context of current and emerging technology, and the experience that the Nation has acquired since Explorer I was launched 24 years ago. We investigated America's civilian space policy from the point of view of its effects on four primary areas of space applications technology, including space transportation. More than 100 experts from business, government, the university community, and public interest groups participated in OTA's assessment.

The current situation can be summarized as follows: For the past 25 years, the United States has been the world leader in developing and using space technology for private and public civilian applications. However, increasing domestic institutional and fiscal constraints, as well as the rapid growth of foreign competition, present Congress with four key issues of national policy: 1) What is the appropriate division of responsibility between the Federal Government and private industry in funding or otherwise encouraging civilian space applications research, development and demonstration? 2) What entities should operate space systems once they are

developed and demonstrated? 3) What is the most appropriate relationship between the civilian and the rapidly expanding military space programs? 4) What major new space projects, if any, should the United States embark on after the space shuttle?

In exploring these issues, OTA repeatedly encountered two disturbing realities:

- First, competition from newly operational European and Japanese systems is beginning to threaten U.S. leadership in commercially profitable space technologies. The United States already spends far more on space than do Europe or Japan, but aggressive foreign programs focused on commercial ventures are better designed to respond to the growing marketplace for space services than is the U.S. program.

- Second, the challenge of meeting foreign competition is aggravated by the absence of agreement within the Federal Government about the future direction or scope of the U.S. civilian space program. For space applications in particular, lack of agreement on appropriate goals has made it difficult for the executive agencies to develop space systems that meet user needs, to transfer technology and otherwise encourage private sector investment, and to initiate new programs and/or implement mandated ones.

The U.S. civilian space program is technologically capable, but it must develop more flexible policies and institutions to meet changing conditions. To that end, it is important for the Government to enlist a greater share of private resources in space technology. A great part of the success of the

European and Japanese programs results from their institutional arrangements, within which private and public sectors can work well together.

Although an increased role for the private sector is important, we must not lose sight of the fact that the Government continues to retain a crucial function in at least four areas that are essential to the Nation's future in space: contribution to basic research and development (R&D), support of space science, provision of public goods and services, and regulation/coordination of national efforts, particularly with respect to international agreements.

In its assessment OTA examined four space applications technologies satellite communications, satellite land remote sensing, space transportation, and materials processing. These specific analyses provided a means to examine the more general issue of policy and goals. The results of those analyses are summarized in my written testimony.

- **Satellite Communications.** Because satellite communications is by far the most profitable of current space technologies, relinquishing U.S. technological leadership in this field could lead in the future to a major loss of revenues for domestic firms. Here the major policy issue is the role NASA should play in research in advanced communications.

  It appears that creative new mechanisms for Government/private sector cooperation could be established to develop 30/20 GHz systems. A joint public/private demonstration project, with substantial financial participation from several corporations, might be possible and desirable. However, in order to encourage private entry into such an arrangement, appropriate incentives would have to be devised.

Satellite Land Remote-Sensing - Since 1972 the United States has had the only global civilian remote-sensing system. Landsat's importance as an aid in managing and developing U.S. and foreign natural resources and as a source of revenue from data sales to foreign countries makes it essential that continuity of data flow be maintained. Today, however, it is unclear whether the United States will have any civilian remote sensing after 1985: neither the Government nor the private sector is committed to maintaining a system after Landsat 4 fails. In the absence of a U.S. initiative, France's SPOT system, scheduled to be launched in 1984 by a French Ariane, will become the monopoly supplier of remotely sensed data.

Space Transportation - The growing need for commercial and government launch services exceeds the shuttle's projected availability. If the United States has no expendable vehicles (ELVs) ready to launch commercial satellites at competitive prices, then the private sector, and perhaps government agencies as well, will be forced to purchase launch services from France's Arianespace. Several U.S. companies have already decided in favor of launching on Ariane.

However, foreign competition is not the only policy concern for space transportation. Currently the entire U.S. capacity for launching objects into space rests with NASA and the Air Force. Government policy is unclear on: a) whether it is desirable to commercialize the space shuttle, and if so, what interim steps are needed, b) whether it is desirable to commercialize ELVs, and c) what is the proper approach to take towards encouraging and regulating commercial launcher ventures.

- **Materials processing.** Determining the economic feasibility of manufacturing high-value, low-volume products in space will require considerable further R&D by the Government and the private sector. To date, only McDonnell-Douglas has committed itself to a long-term space manufacturing project. The central issue here is the degree and kind of Government incentives available to firms that wish to consider materials processing. The Government could, for example, conduct generic and publicly available R&D on the shuttle or the European-built spacelab, or it could offer to share the costs and results of research efforts through specific agreements, such as the NASA-industry Joint Endeavor Agreement. Both Europe and Japan are pursuing extensive long-term research in materials processing.

Broadly speaking, the OTA assessment found that our substantial civilian space capabilities and assets could be more effectively used if several changes can be made in the way government organizes itself. Two key changes are:

- closer civilian-military planning, including emphasis on technology transfer, and possible joint management and funding of common interest projects, where appropriate;

- establishment of a high-level multi-representative body to coordinate Federal space policy. It should be as diverse and broad-based as possible. Ideally, it should include representation from Congress, from private companies, and from government user agencies, along with NASA and the military/intelligence community.

I will now turn to an analysis of the Administration's National Space Policy as disclosed in the White House Fact Sheet:

The introduction states basic goals and principles of U.S. space policy; they represent little change from the goals and principles of the 1958 NAS Act or the policy of the previous Administration.

This section places a stronger emphasis on national security than do any previous policy statements, and highlights U.S. opposition to any restrictions on national security programs. The 9th and last principle is the only new one, and states that "The United States will continue to study space arms control options" and will consider arms control measures affecting the testing and deployment of specific weapons systems. However, it makes no commitment to specific measures or negotiations.

Section 2, on the Space Transportation System, has no parallel in earlier policy statements. Though it commits the United States "to maintaining world leadership in space transportation with a STS capacity sufficient to meet appropriate national needs," it leaves unclear how this will be done in the absence of a fifth shuttle orbiter or, alternatively, continued production and operation of expendable launchers (ELVs).

This section also repeats the long-standing intention eventually to replace ELVs with the shuttle. OTA has pointed out that the policy of phasing-out ELVs has prompted ELV manufacturers to reduce their production; this reduction, in turn, leads to a sharp increase in the cost of domestic ELV launches. If ELVs, particularly the Thor-Delta and the Titan, were allowed to be sold and operated by the private sector could provide the United States with several immediate advantages: competition for the French Ariane, added incentives to NASA to bring down the costs of shuttle operations, and backup to the shuttle for all users, civilian and military.

Finally, this section raises the possibility of establishing a different institutional structure for STS, but it does not indicate what form a transition might take. The OTA report notes that planning for institutional changes, particularly commercialization, needs to begin as early as possible and should include direct participation by interested private firms.

Section 3 of the Fact Sheet discusses the Civilian Space Program and includes four program goals and four paragraphs on policy. The goals differ in a number of significant ways from previous statements. For example, the Fact Sheet makes no commitment to Government operation of space systems. It also appears that a more limited range of applications will be pursued.

The question of an ambitious future central project is addressed but not decided; the possibility of a permanent space facility is left to continued examination.

On the issue of private sector involvement, the second principle states that "The United States Government will provide a climate conducive to expanded private sector investment and involvement in space activities," but fails to indicate how this may be done, or in what areas.

In OTA's view, policy guidance for land remote sensing is long overdue. The needs of both foreign and domestic data users make it essential that the continuity of data for Landsat or a replacement satellite be maintained. However, at the present time it is unclear whether the United States will have any civilian land remote sensing capability after 1985. OTA identified several options for maintaining data continuity, including private ownership, international ownership, or continued government ownership. If the Landsat program is to be tranferred out of the government, planning must begin now. Otherwise, after 1985, U.S. customers may find themselves constrained to purchase data from the French SPOT system.

The directives of **Section 4**, which address the National Security Space Program, are for the most part identical to past policy. The statement that the U.S. will develop an operational anti-satellite capability is new but follows directly from the Carter policy position that the U.S. would develop such a system unless an arms-control agreement could be reached with the Soviet Union.

The directives of **Section 5** on civilian military relationships are identical to past policy, except for the final paragraph which makes explicit that the general goal of increasing coordination and avoiding unnecessary duplication will not prohibit maintaining separate operational systems.

The **Sixth** and perhaps most important section concerns Policy Implementation. In order to provide a forum for all Federal agencies, to review space policy, and to refer policy issues to the President, the policy institutes a Senior Interagency Group chaired by the Assistant to the President for National Security Affairs.

Notably absent from this group are several civilian agencies with strong interests in the national space program, such as:

- The Department of Interior
- The Department of Agriculture
- National Science Foundation, and
- Agency for International Development

In addition, there is no formal provision for advice from the private sector. Placing responsibility for space policy in the NSC, tends to over-emphasize military/intelligence at the expense of civilian interests.

Conclusion - It seems fair to say that, compared to past policy, the Reagan National Space Policy makes few substantive changes. It reflects a somewhat greater emphasis on national security programs than past statements and a corresponding reduction in priority and scope of civilian operational systems. The policy explicitly commits the Government to developing an anti-satellite system, but leaves the question of a space station unresolved.

What seems disturbing about this new policy statement is the fact that a number of serious problems having to do with inadequate institutional support, lack of long-range goals, and poor coordination and implementation of policy remain unaddressed. Of the major problems identified by OTA in its study, most are either ignored or exacerbated. For instance, on the issue of commercialization, the Fact Sheet makes no statement about specific policy or about specific systems, particularly land remote-sensing. There is also no indication whether some or all civilian systems should, as a matter of policy, remain in the Government and, if so, under what circumstances. The increasingly evident inability of the space shuttle capacity to meet the needs of domestic users during the 1980s is likewise not addressed.

With regard to foreign space programs, the policy fails to recognize the need to meet rapidly rising competition, nor does it mention the concrete prospects for mutually beneficial cooperative ventures, either in remote-sensing, development of the STS, or space station planning. It does not discuss the political or commercial pros and cons of aid to developing countries, nor the importance to the U.S. of improved planning for meetings of international organizations that have to do with space. OTA is currently working on an assessment of International Cooperation and Competition in Space, which was requested by this Committee. We will be studying these and related concerns.

Finally, because of the composition of the Senior Interagency Group, several civilian government agencies and the U.S. private sector will have no established means to participate in space policy formulation and implementation; by the same token, the military/intelligence community has been given unambiguous control over policy decisions.

The results of the Reagan policy review raise the questions: why was it undertaken? What problems was it meant to resolve, and why did it fail to address issues of central importance? The answers to these questions are beyond the scope of OTA's analysis. What is certain is that the important problems will not simply go away.

In light of the need to address those issues that the President's policy statement did not consider the Congress may wish to take a more active role in developing a national space policy. To aid in this effort, it may also be appropriate for the Congress to obtain information and advice from representatives of all the major communities interested in space. Several possible mechanisms for doing this are offered in OTA's report. They include holding cooperative hearings between committees with jurisdiction over military and civilian space activities, reestablishing a new version of the National Aeronautics and Space Council, or setting up a National Commission on space that would include congressional representation.

Mr. FLIPPO. We certainly will. Thank you very much for your testimony. I think you are addressing some of the concerns that almost every member of this committee is concerned with.

I believe at this time I will yield to the gentleman from California, Mr. Brown.

Mr. BROWN. Mr. Chairman, I will merely use this time to express my appreciation to Dr. Gibbons for the OTA study and the work which went into it. I think it has been a most valuable contribution to the consideration of the committee. As he probably recognized, many of the questions propounded to the earlier witnesses stemmed directly from the questions raised in the OTA report.

I might also say that the way it was presented, as both a full-length report and an abridged report, and as a 1-page brief, all made it susceptible to maximum utilization by people with different degress of interest in the subject. I found all of the different presentations to have specific value.

I do have a number of questions which, if I had more time and the bells were not ringing, I would like to propound. However, I will defer those, Mr. Chairman.

Mr. FLIPPO. Thank you, Mr. Brown.

Mr. Hollenbeck?

Mr. HOLLENBECK. Thank you, Mr, Chairman.

Like Mr. Brown, I want to thank you for a very incisive analysis, I think, of policy and also for some recommendations that you make in here as well, including some of your final recommendations concerning cooperation between committees having jurisdiction over these matters so that we do not operate in the dark in terms of what the military committee is doing and they, of course, are in the dark in terms of our thoughts and our expertise. Therefore, I, like the gentleman from California, will defer any questions. I have some and I will submit those in writing.

Thank you.

Mr. FLIPPO. Thank you.

Mr. Winn?

Mr. WINN. Thank you, Mr. Chairman.

I just want to congratulate you, John, on very fine testimony. Let me ask one quick question: Have you made your studies, your OTA studies on this available to Jim Beggs and Jay Keyworth?

Dr. GIBBONS. Yes, sir. These were delivered to Administrator Beggs and to Jay Keyworth the same day they were sent to the Congress.

Mr. WINN. OK. The other question: Are we, the members of the committee, being unfair in trying to mix policy and programs? There seems to be quite a differential there, and maybe we are talking about programs and they are talking about policy.

Dr. GIBBONS. Mr. Winn, it strikes me that it is not unfair because programs derive from policy. It seems to me that it is important to think of the hierarchy of policy formulation, beginning with a sense—whether they are implicit or explicit—of national goals with respect to space. What is it we really have set for a goal? Is it, for instance, a goal of dominant influence in space technology and science throughout the world? Are there other goals that we can set for ourselves?

Given those goals, they translate to what one might call strategies, that is, how do we meet that goal? Do we put a man on the moon? Do we commit to being first in space science? Are we first in effectiveness of public/private technology transfer? These are strategies and Both the goals and the strategies can combine to constitute a policy.

The thing that follows from goals and strategies are tactics; that is, if you know where you are going—for example to the moon—then how do you get there? If we want to have a larger broad-band capability for antenna work in the year 2000 and meet all world needs, and we choose to take the lead in it, that policy may lead you automatically to a geostationary orbit platform. The platform, then, the project decision, follows from those strategies and goals. All of this—goals, strategies, and even tactics comprises a policy.

Therefore, I think your questions are fair. If you cannot say, "I do not know whether or not to build a platform," then that says maybe that you do not know what your strategies are, and that you do not know where you are trying to go.

Mr. WINN. Thank you very much, John.

Mr. FLIPPO. Dr. Gibbons, thank you very much. We would like to pursue this further but, as you can see, we have a vote on the floor. We are grateful for your work and I expect we will be visiting again with you.

Dr. GIBBONS. Thank you, Mr. Chairman.

Mr. FLIPPO. Thank you very much.

The subcommittee stands adjourned.

[Whereupon, at 4:30 p.m., the subcommittee recessed, to reconvene at the call of the Chair.]

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